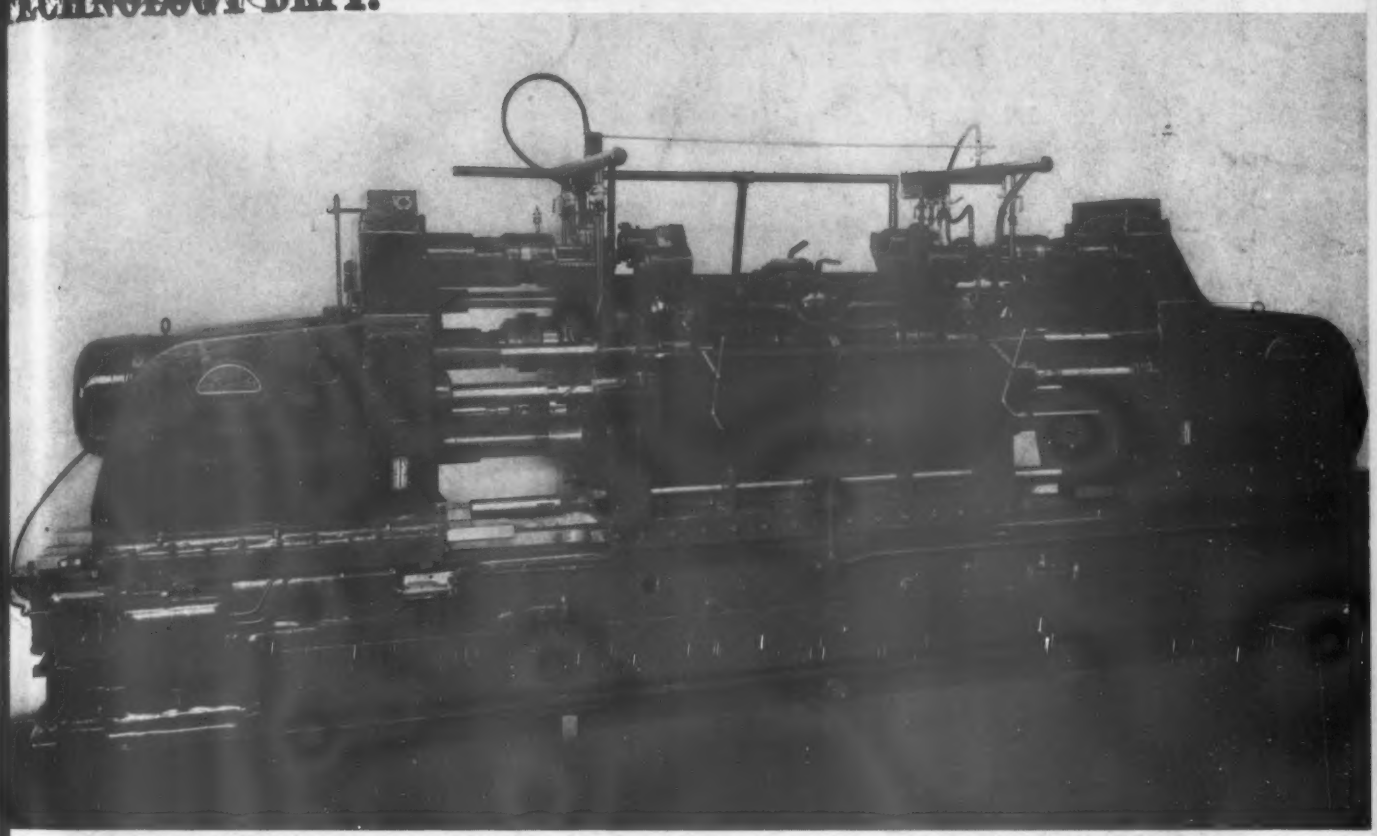
The TOOL ENGINEER

First Copy

PUBLIC LIBRARY
NOV 1 1 1937

TECHNOLOGY DEPT.



Two Way High Production Equipment by Snyder Tool & Engineering Company — finishes rear axle housing ends complete. *See story page 24.*

In This Issue:

Threads As Threads See Page 9

Specialized Die Head and Tap Applications See Page 13

Various Thread Forms and Their Uses See Page 16

Screw Thread Inspection See Page 11

Ground Threads Offer Many Advantages See Page 14

News of Mass Manufacturing from Everywhere See Page 18

NOVEMBER 1937

Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

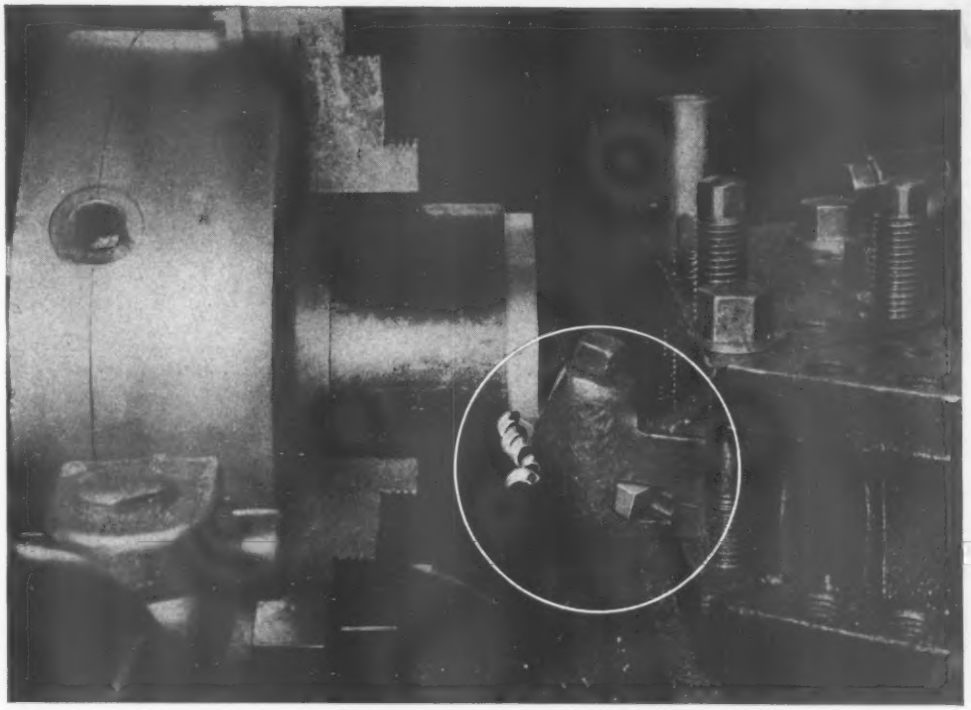
Strip thickness controlled to "tenths" at 1100 ft. a minute

ROLLING!

Working in a haze of steam and floods of coolant the P&W Continuous Gage or "Flying Mike" shows strip thickness accurately to ten-thousandths of an inch at high mill speeds. As long as the indicator needle (upper left) rests on zero the strip is the correct gage. Let the thickness vary by ever so little and the needle shows the error instantly. It is simple, positive, precise — modern strip mill gaging. For the complete story write to Pratt & Whitney, Division Niles-Bement-Pond Company, Hartford, Conn.

PRATT & WHITNEY ELECTROLIMIT
CONTINUOUS GAGES

PHOTO COURTESY
JONES & LAUGHLIN STEEL CORP.



Haynes Stellite J-METAL cuts Chrome-Vanadium Steel

• On a turret lathe production job, Haynes Stellite J-Metal tools are used for turning, facing and boring SAE 6135, a tough chrome-vanadium steel. The turning operation is illustrated. Surface speed is 104 feet per minute, feed 0.014 inch per revolution, and depth of cut 1/8 to 3/16 inch. Machining costs on this and many other steel cutting jobs have been materially reduced by Haynes Stellite J-Metal tools.

Forty-four actual production jobs are pictured and described in "Haynes Stellite J-Metal Cutting Tools", a new 56-page operating manual on machining with Haynes Stellite J-Metal. This reference book will tell you how, when and where to use Haynes Stellite J-Metal profitably. Write for your copy today. There is no obligation.

PRODUCT OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

J-METAL HAYNES STELLITE TRADE MARK

A red-hard, wear-resisting alloy of Cobalt, Chromium and Tungsten

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

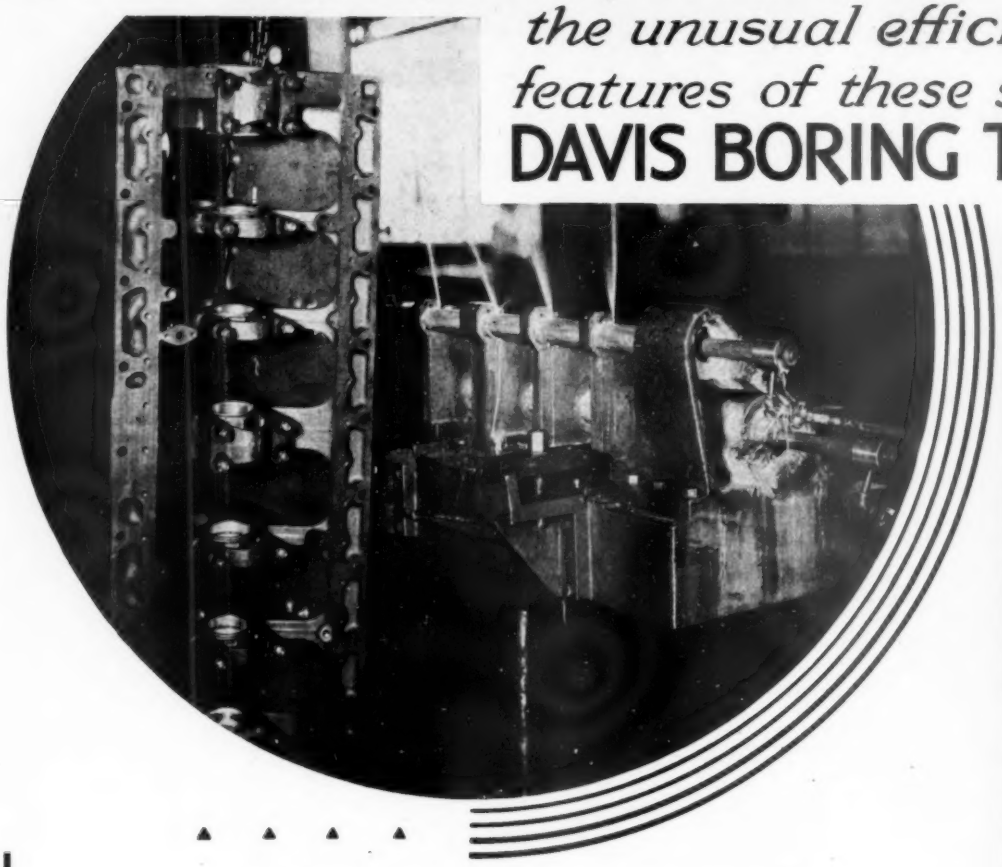
UCC

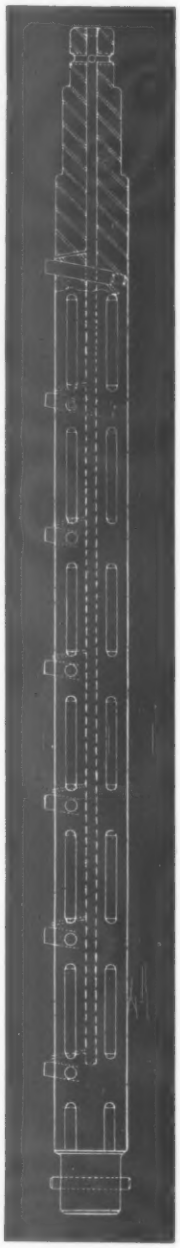
Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

General Office and Works—Kokomo, Indiana
Foreign Sales Department—New York City

Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 46 apparatus shipping points of The Linde Air Products Company

Waukesha Motor Co. enthusiastic about *the unusual efficiency features of these special* DAVIS BORING TOOLS





IN this unusual set-up, Davis Boring Tools of special design, are used for finish boring the babbitt lined cam and crank hole bushings in Waukesha motors

The outstanding feature of the job is the *lubricant line* which runs the entire length of the boring bar, applying the lubricant to each cutter at the point of cutting. To accomplish this, the Davis Tool was constructed with a special head which is free to revolve on the bar, and through which the lubricant is applied to the bar while the latter is in rotation.

Applying lubricant in this manner enables Waukesha Motor to obtain the smooth, clean finish they desired; and also eliminates the difficulty with chips which is usually encountered in boring babbitt.

These special Davis Boring Bars were made of a high carbon, chrome-nickel steel, heat-treated for toughness. Tool steel wear strips were dove-tailed into the bar and peened securely with copper. Round tool bits (H.S.S.) were used in the set-up to finish bore babbitt.

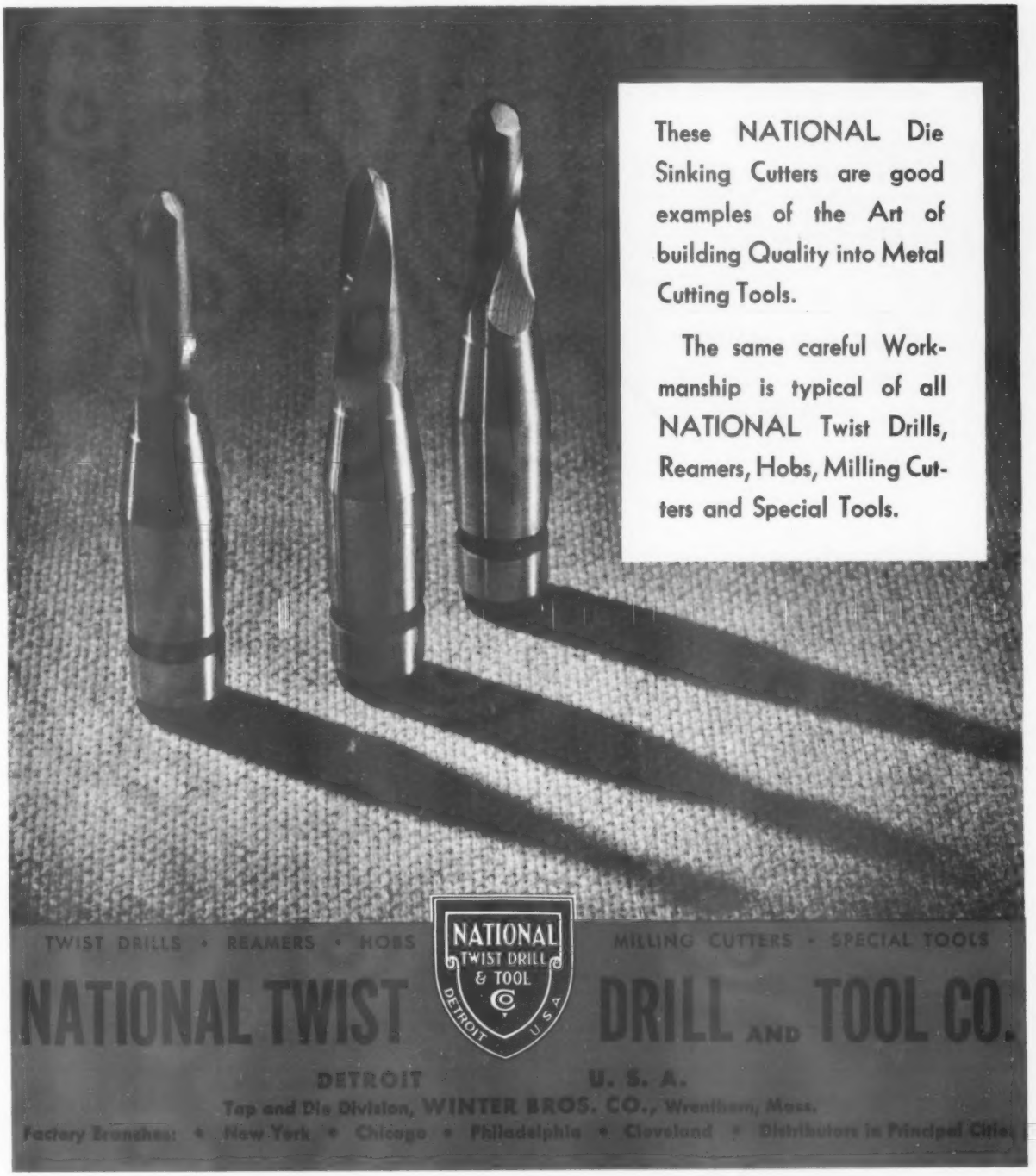
If *you* have a *special, unusual* boring job, it will pay you to investigate Davis Boring Tools. Send us prints of your work, and without obligation, we'll gladly submit you a helpful, specific recommendation.

DAVIS BORING TOOL DIVISION,
Larkin Packer Company, Inc.
St. Louis, U.S.A.

DAVIS BORING TOOLS

NATIONAL

QUALITY and WORKMANSHIP


These NATIONAL Die Sinking Cutters are good examples of the Art of building Quality into Metal Cutting Tools.
The same careful Workmanship is typical of all NATIONAL Twist Drills, Reamers, Hobs, Milling Cutters and Special Tools.
TWIST DRILLS • REAMERS • HOBS
MILLING CUTTERS • SPECIAL TOOLS
NATIONAL TWIST DRILL AND TOOL CO.
DETROIT U. S. A.
Tap and Die Division, WINTER BROS. CO., Wrentham, Mass.
Factory Branches: • New York • Chicago • Philadelphia • Cleveland • Distributors in Principal Cities

The Tool Engineer

Trademark Registered in U.S. Pat. Off.

Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. VI NOVEMBER, 1937 No. 7

Contents This Issue

NEWS

Production Perspectives — News of Mass Manufacturing from Everywhere 18
Chapter Doings 19

TECHNICAL

Threads as Threads, by John A. Markstrum . . . 9
Screw Thread Inspection, by R. O. Beardsley . . 11
Specialized Die and Tap Applications, by A. F. Breitenstein 13
Screw Threads 25
Ground Threads Offer Many Advantages, by Gilbert Stewart 14
Various Thread Forms and Their Uses, by M. B. Henneberger 16
Buying and Selling Time, by Ralph H. Butz . . . 54

A.S.T.E.

November Chapter Meetings 22
Chapter Doings 19

FEATURES

Handy Andy's Workship 30
New Equipment 50

ADVERTISERS' INDEX 62

AMERICAN SOCIETY OF TOOL ENGINEERS

Frank A. Shuler, President
Luke E. Beach, 1st Vice President — Frank R. Crone, Treasurer
Walter F. Wagner, 2nd Vice President — C. Ray Brunner, Secretary
Ford R. Lamb, Executive-Secretary

Board of Directors — 1937-38

L. E. Beach, M. A. Blu, E. Bouton, C. R. Brunner, J. A. Bullard, S. W. Burgess, T. B. Carpenter, F. W. Creager, F. R. Crone, A. H. d'Arcambal, E. W. Dickett, F. W. Eaton, A. Ehrhardt, J. A. Elwood, R. A. Fintz, A. C. Goddard, I. F. Holland, A. Johnson, F. R. Lamb, L. J. Radermacher, J. D. Reep, L. D. Rigdon, K. K. Roby, A. E. Rylander, A. M. Sargent, F. A. Shuler, J. A. Siegel, G. A. Smart, W. H. Smila, C. F. Staples, J. R. Weaver, G. W. Wise, P. F. Zerkle

Chairmen of Committees

Nominating: S. S. Randall
Industrial Relations: T. B. Carpenter
Publicity: U. S. James
New Chapters: Roy T. Bramson
Standards: W. H. Smila
Historian: O. B. Jones
Membership: W. J. Fors
Editorial: A. E. Rylander
Constitution and By-Laws: R. M. Lippard

Chapters

Baltimore: Nils H. Lou, Chairman; J. Harvey Chandler, Secretary, c/o Glenn L. Martin Company, Tool Engineering Dept., Baltimore, Maryland

Bridgeport: John Bullard, Chairman; Chester A. Dundore, Secretary, 1178 Wells Place, Stratford, Conn.

Buffalo: J. Don Reep, Chairman; Ben Buerk, Secretary, 315 Grote Street, Buffalo. Telephone: Delaware 6100.

Chicago: Franklin W. Creager, Chairman; Willard T. Wilson, Secretary, 1026 S. Homan Ave., Chicago. Telephone: Kedzie 0244.

Cleveland: P. F. Zerkle, Chairman; C. V. Briner, Secretary, 1433 E. 12th Street, Cleveland.

Detroit: C. F. Staples, Chairman; Floyd W. Eaton, Secretary, Burroughs Adding Machine Company, Detroit.

Hartford: A. H. d'Arcambal, Chairman; Frederic L. Woodcock, Secretary, 56 Imlay Street, Hartford.

Milwaukee: George A. Smart, Chairman; Julius A. Riedl, Secretary, 3965 N. 15th Street, Milwaukee. Telephone: Concord 3061M.

Pittsburgh: James R. Weaver, Chairman; D. L. Shelly, Secretary, Westinghouse Air Brake Company, Wilmerding. Telephone: Valley 1490.

Racine: Eugene Bouton, Chairman; Henry Springhorn, Secretary, 1615 St. Clair Street, Racine.

Rockford: E. W. Dickett, Chairman; H. O. Olson, Secretary, 1610 Seventh Avenue, Rockford, Ill.

Toledo: August Ehrhardt, Chairman; Lorence E. Rennell, Secretary, 240 Crawford Ave., Toledo. Telephone: Jefferson 2538-W.

Twin Cities: K. K. Roby, Chairman; Gunnar G. Widen, Secretary, 1408 Park Avenue, Minneapolis, Minn.

Application blanks and information pertaining to membership in the American Society of Tool Engineers may be had by addressing **The Tool Engineer**, 2842 W. Grand Boulevard, Detroit, Michigan, or the Secretary's office, 5928 Second Blvd., Detroit, Michigan. **Dues** are $5 initiation fee, $6 per year for senior grade membership and $3 per year for junior grade membership. Junior membership initiation fee $2.

The Tool Engineer is published on the first Thursday of each month. It is the official publication of the American Society of Tool Engineers, Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, Tool Engineers, tool designers and others who are responsible for production in mass manufacturing plants throughout the nation and in some foreign countries.

Owing to the nature of the American Society of Tool Engineers, a technical organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

MEMBER OF CONTROLLED CCA CIRCULATION AUDIT, INC.

Published by
THE BRAMSON PUBLISHING CO.
2842 W. Grand Boulevard MAdison 7553 Detroit, Michigan
Roy T. Bramson, Publisher and Editor

ADVERTISING OFFICES:

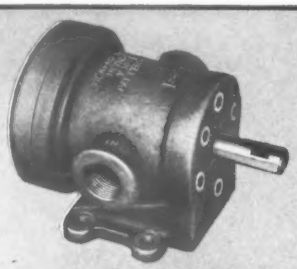
Chicago, Illinois
Dwight H. Early
100 N. LaSalle Street
CENtral 4158

New York City
F. W. Finn
366 Madison Avenue
Murray Hill 2-0997

Providence, R. I.
Herman T. Pierik
4 Weybosset Street
GAspee 1568

Printed in the United States of America

VICKERS HAS THE ENGINEERING RESOURCE, THE EXPERIENCE AND FACILITIES TO DEAL WITH ALL KINDS OF HYDRAULIC DRIVE AND CONTROL PROBLEMS



VICKERS Balanced Vane Type Rotary Pump.

VICKERS Hydraulic Variable Speed Transmission.

● Oil hydraulic controls and drives have been brought to a high state of development and popularity by the Vickers engineering organization.

Fifteen years of accumulated experience—manufacturing equipment which meets the most exacting and varied requirements—continuous engineering research and study—these give Vickers, Inc., unlimited resources in dealing with all kinds of hydraulic drive and control problems.

A Vickers Hydraulic Control or Drive on any machine has become a mark of superior quality.

The Vickers line of high pressure oil hydraulic pumps, valves, and controls, is the most complete line available . . . it includes four thousand standardized items. Specialization in research, design, building, testing and application of these products has given the Vickers organization an exceptional background to help other manufacturers contemplating the use of hydraulic drives and controls.

Vickers equipment has proved its economy and satisfactory performance throughout industry. More and more users and builders of machine tools, presses, automotive machinery, plastic molding equipment, etc., are specifying Vickers.

Vickers Electric-Hydraulic Control Panel.

VICKERS Hydraulic Relief Valve (Balanced)

4000 STANDARDIZED (Oil) Hydraulic Pump and Control Units to Choose From!

We Help You Combine and Engineer Them to YOUR Particular Requirements . . .

ROTARY PUMPS
- Constant Displacement
- Variable Displacement
- Balanced Vane Type
- Balanced Gear Type
- Multiple Piston Type

PRESSURE CONTROLS
- Relief Valves
- Unloading Valves
- Sequence Valves
- Reducing Valves
- Pressure Switches

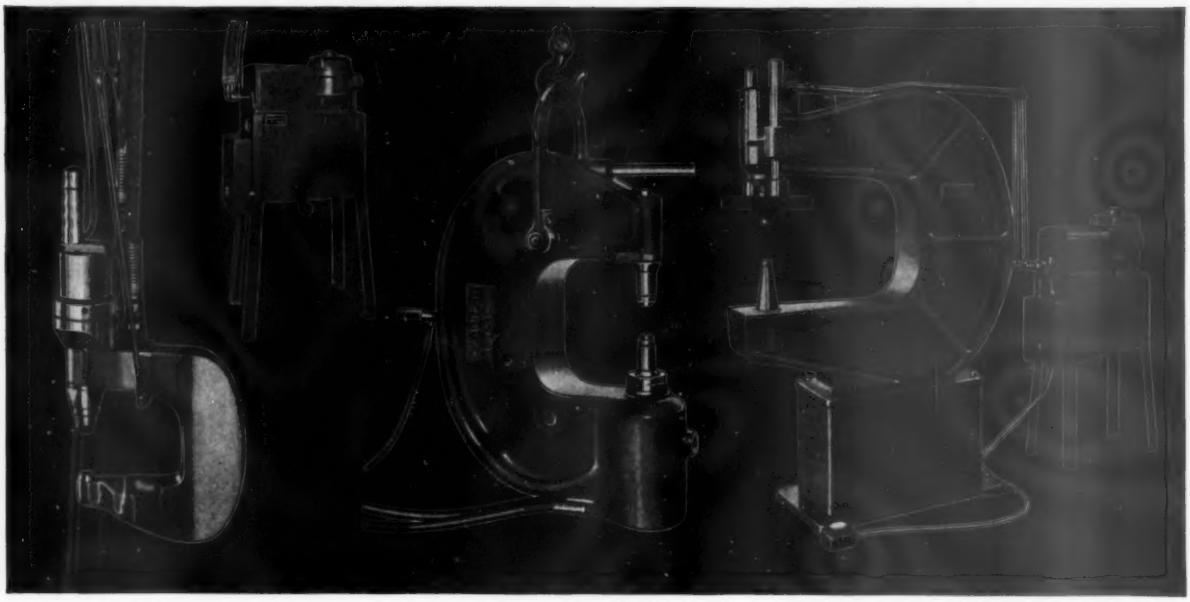
VOLUME CONTROLS
- Adjustable Flow Valves
- Metering Valves
- Flow and Overload Relief Valves
- Deceleration Valves
- Time Delay Valves

DIRECTIONAL CONTROLS
- 2-, 3-, 4-, 5-, and 6-Way Valves
- Manual, Pilot and Solenoid Types
- Shut-Off Valves
- Pilot and Pilot Interlock Valves
- Check and Prefill Check Valves

CONTROL ASSEMBLIES
- Traverse and Feed Panels
- Reciprocation Panels
- Special Purpose Panels
- Multiple Unit Valves
- Accumulators and Power Units

FLUID MOTORS
- Constant Displacement
- Variable Displacement
- Balanced Gear Type
- Multiple Piston Type
- Cylinders

Simpler, Faster
RIVETING and PUNCHING
WITH HANNIFIN *"hy-power"* HYDRAULIC UNITS



17½ ton Portable Yoke Riveter. Reach 6 inches, stroke 3 inches, gap 6 inches. Time cycle 1½ seconds. At right, motor driven "Hy-Power" Hydraulic Pressure Generator.

35 ton "Hy-Power" Portable Riveter. Reach 12 inches, stroke 3½ inches, gap 9 inches. Time cycle 3 seconds.

35 ton "Hy-Power" Hydraulic Punch and Riveter, adaptable to a variety of work. Ram has platen for mounting strippers or other fixtures. Stroke 6 inches, gap 14⅝ inches, reach 30 inches. Time cycle 4 seconds.

● The lightning-fast push-button controlled riveter cycle of these Hannifin "Hy-Power" hydraulic units sets an entirely new standard of performance in production riveting, punching and other operations. Both portable and stationary types greatly simplify handling of work, and the "Hy-Power" working cycle is faster and more easily controlled than with any other type of equipment.

"Hy-Power" hydraulic operation gives the following automatic cycle: 1. Rapid advance stroke; 2. Automatic high pressure; 3. Reversal at maximum pressure; 4. Rapid return stroke. The pump idles at zero pressure between cycles. Speeds range from 1½ seconds for a 17½ ton unit to 3 seconds for a 50 ton 4 inch stroke unit.

Hannifin "Hy-Power" hydraulic units are available in portable and stationary types, capacities 2 tons to 50 tons or more, for punching, riveting, pressing, crimping, press assembly and similar operations. The individual hydraulic pressure generator units are motor driven. Write for Bulletin 40 giving specifications.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue
Chicago, Illinois

Detroit Office: Hayward Building,
4829 Woodward Avenue
Telephone Columbia 4949
R. A. Bean, Mgr.

HANNIFIN *"hy-power"* HYDRAULIC UNITS

ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

"A touch of historical romance is illustrated in the photograph above of spool bracket and its belt adjusting screw, parts of a hand-made, century-old spinning wheel. The screw and nut are made of wood and the threads are in a wonderful state of preservation considering the amount of use they have had."

THREADS AS THREADS

By

John A. Markstrum

Chief Engineer

Continental Tool Works

Technical Editor for this issue

IN EDITING A SUBJECT as well known and universally used as screw threads one may feel that it is a somewhat "threadbare" subject. Delving into it more deeply it is like most other subjects—including individuals—highly intriguing as a study.

The screw thread may have suggested itself from a vine wound around a limb of a tree sometimes partly imbedded in the bark, or a string wound around a cylinder.

The earliest record of threads is a worm pump developed by Archimedes (250 B.C.) consisting of sheet metal forming a coarse spiral around a cylinder somewhat like a carpenter's bit. It was introduced in Egypt as an improvement on skin buckets for elevating water. How efficient Archie's pump was is uncertain, but Egyptians still use skin buckets, and they should know.

Screw threads lay dormant for centuries and then Leonardo Da Vinci developed it as a propeller, but lacking motive power it was next to useless. John Erickson later modified it and put it to practical use in the modern screw propeller used on steam and motor ships. This invention, by the way, was of more practical value, and less dangerous, than his Monitor.

"The first screws were in all probability threaded by means of filing. Beson (France 1569) invented a screw cutting gage for the lathe which was in use until 1841 when an Englishman (Hindley of York) improved upon it and this was used by watchmakers for producing small screws.

"A hand operated machine was invented in 1836 by an American and an automatic machine came into use in 1848. Both of these machines produced wood screws."*

* Excerpt: "Screw Threads to Close Limits" by Howard E. Adt.

Purposes

Broadly speaking, screw threads can be classified in the following order of importance as means for: (1) Detachable mountings, (2) Actuation of parts, (3) Adjustment, (4) Amplified force, and (5) Measuring.

No other means known today can compete with the screw for attaching and detaching parts of an apparatus. No other means can replace the screw for controlled movements, as for instance, feed screws on machines and worm drives in which the worm is actually a glorified screw running with the conjugate form on the gear.

Screws are universally used as means of adjustment in almost every kind of device from the smallest watch to the largest machine — or Rube Goldberg's wildest dream.

Jack screws symbolize the mechanical advantage obtainable in simple and compact form; if you've ever had a flat tire on a lonely road you'll know what I mean.

Everyone concerned realizes the importance of the micrometer caliper, invented by a man in a steel mill as a convenient method of measuring steel sheets. It is the most widely used precision measuring instrument of our age.

As screws have been in use for a comparatively short time, one wonders how mankind got along so remarkably well for thousands of years without them. When they finally arrived their early use was mainly in instruments of torture! The slang expression "put the screws on him" actually has its origin in this misuse of one of the most indispensable mechanical mediums.

Production of Threads

External threads are produced efficiently by the following methods: (1) Self opening dies. (2) Thread hobs, which have multiple thread form without helix. The cutting edge of these is longer than the thread to be produced and completes the thread in one revolution of work. (3) Single form thread milling cutter. (4) Flat thread rolling dies having multiple thread form on one side inclined on the same angle as helix of threads. (5) Grinding. Recently developed grinding machines produce accurate thread in incredibly short time.

Internal threads are produced by the following methods: (1) Taps. Solid or collapsible. (2) Thread hobs, completing the thread in one revolution of work. (3) Single form thread milling cutter. (4) Grinding. Internal attachments on standard thread grinding machines permit accurately finishing internal threads.

"The pulley on the spindle is also mounted on a left hand thread cut on the spindle, which is made of steel, and a steel nut is inserted in the pulley."

The development of threads from a rudimentary idea to the precision attainable today would form an interesting library—if available. Unfortunately, most of the history of this work was never recorded. The men who did this work were not publishers of technical matter, but rather guarded their trade-secrets for their self-protection. It is known, however, that square or rectangular rods were wound around round bars in double coil springs, a flat coil being used to fill the space between the coils of the first to form the root diameter. These two coils or springs were then brazed to the bar, forming a screw. The nut was formed in a similar manner and brazed to the inside of a tube. The latter was even used in conjunction with cut screws of the square thread type in order to facilitate manufacturing.

Importance of Accuracy

When lead screws were first cut they were more or less — mostly less—accurate and to modify this inaccuracy a nut was rotably mounted and a lever attached to the nut was then brought to bear on the edge of a steel plate mounted parallel to the screw. The edge of the plate was then filed into an irregular cam so as to cause rotation of nut either backward or forward to correct the inaccuracies. With infinite labor more accurate screws were gradually produced. When it is considered that size of pitch diameter, lead errors, oversize crest and sharp root of the male and the truncated crest and sharp root of the female, inaccuracies in thread angles of either male or female or both, "drunken" thread (i.e. varying from a true helical path) affect accuracy, and that any and all of these will cause interference between screw and nut, the importance of accuracy is obvious.

Lead screws have been ruined by torque of sufficient intensity to cause a permanent set. Lead is thereby made either long or short in accordance with the direction of the twist. Lead screws should have the same pitch diameter in both ends, as any slight taper will cause lead errors.

Thread angles are dimensioned in the axial plane and both straight and tapered threads of symmetrical angles are bisected by a line at right angles to the axis.

Some Thread Oddities

Here are a few oddities of threading: A friend of the writer chased 500 threads to the inch or .002" linear pitch on .012 diameter wire, doing this as his regular work for two years. For a nut, a short piece of aluminum rod was split to center and crimped on the threads. This was used as a balance adjustment on a sensitive galvanometer on production basis.

A thread with five starts (quintuple lead) was made accidentally in a local factory with a single lead four-flute tap. It could later be duplicated at will but no other number of threads except single and five starts could be made, the reason seems to be that the tap originally cut one thread and adding the four flutes to the single lead made five starts. Your guess is as good as mine.

Screws can be cut or ground to slightly longer or shorter lead by either cooling or warming the workpiece. In fact, the heat generated incident to grinding a thread is a hazard where extreme accuracy is demanded, unless ample coolant is available.

A complaint was made by a firm stating that taps furnished them varied three thousandths on pitch diameter and as proof showed two identical taps in two departments on work of same material. Taps were interchanged and the tap that cut large cut small and vise versa. The trouble was found to be in the machine.

Caps similar to those used on tooth paste tubes have been made on a punch press, threads and all, in one blow; the stock from which cap was made was an ordinary buck shot. This was necessary in

(Continued on Page 12)

SCREW THREAD INSPECTION

By

R. O. Beardsley

Jones & Lamson Machine Company

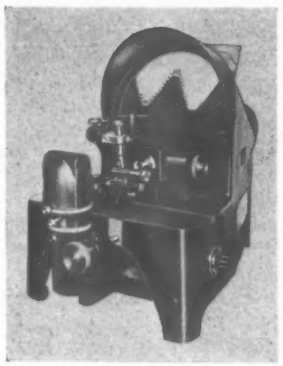
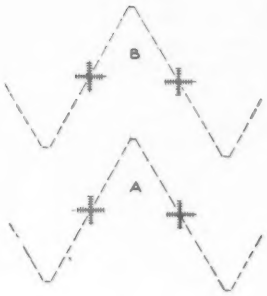


Figure 1



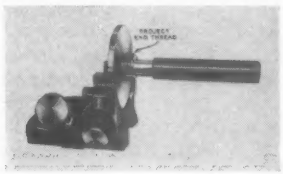


Figure 3

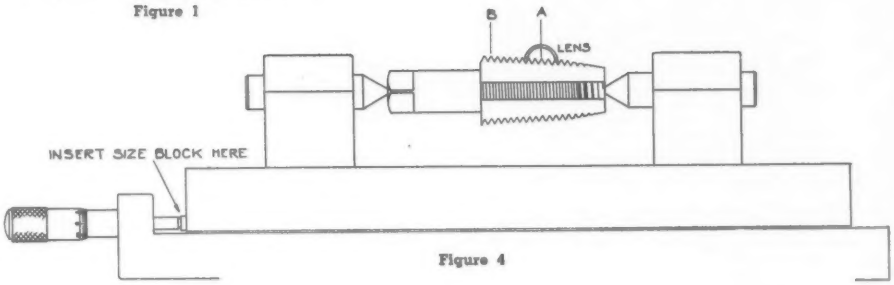


Figure 4

THREADED PARTS have been used for many years. During this time engineering societies, commissions, and individuals have made an exhaustive study of the holding quality of the screw as affected by the form, lead and pitch diameter variations. Nevertheless there are still in use many threaded parts which do not measure up to standard. This is due partially to the fact that it is difficult to manufacture accurate threads on a production basis and partially to the type of gages used for inspection.

Threads were first inspected by screwing a nut onto the external thread, or a threaded part into a nut.

Increased production and greater use of threaded parts brought about the demand for interchangeability. To meet this demand there came into use Thread Micrometers, Go and Not Go Ring Gages, Snap Gages and Thread Plug Gages for gaging threaded holes.

Go and Not Go Gages will show whether the threaded parts will or will not go into the threaded hole, but there is no assurance that they are within prescribed limits.

It has been the custom to tighten up on tolerances when threaded parts did not assemble properly or give satisfactory service. In many cases if the screws had been held to the original specifications they would have given the desired service, but a penalty was added because of inability to detect or locate errors with available gages.

The uncertain factors of form and lead, not detectable with the gages referred to above, can be eliminated by the use of simplified optical projection.

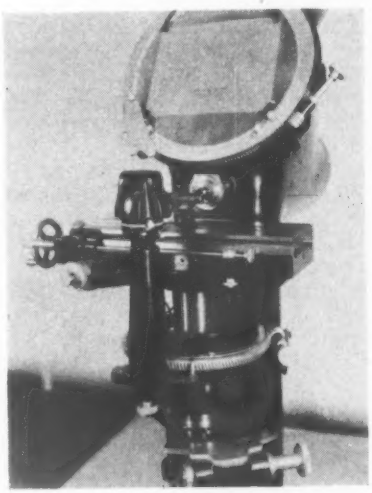


Figure 2

Suitable equipment for simultaneously inspecting by projection the important thread elements (pitch diameter, lead and form) of screws, consists of the following: A source of light, suitable stage in which the threaded parts are held for inspection, a master gage with which the work is compared, and a tolerance chart on which the thread is projected for comparison. (Figure No. 1.)

This type of inspection shows any error that may exist in individual elements and at the same time shows how the accumulated errors will affect the fit in a mating part.

Knowing the individual and accumulated errors, the thread cutting tool can be adjusted to take advantage of the full tolerance.

In manufacturing plants where a large variety of standard and special threaded parts are to be inspected, the form and lead on the first few parts produced should be inspected by projection. For such checking the parts may be staged on the O.D. in a Vee to position the thread for inspection. The Vee stage for holding the part is mounted on a table having a lateral adjustment and provisions for measuring lead. See Figure No. 2. The shadow of the thread is projected onto the screen where it is compared against a master outline; or the angle may be measured to minutes with an Angle Measuring Attachment. The Angle Measuring Attachment, in which the screen is held, operates in conjunction with a one minute vernier. The screen is provided with right angle lines which are in a definite relation to graduations on the screen ring. The screen and ring are revolved to match either the horizontal or vertical line with the flank shadow, and the angle is read on the vernier. After compar-

ing or measuring the thread form, the table carrying the object is adjusted laterally with a micrometer for measuring spacing from thread to thread; or by inserting a size block, the lead may be measured over several threads. If the form and lead are within specified limits the pitch diameter may be inspected with pitch micrometers, Go and Not Go Gages, or by the three-wire system.

By using the projection machine to check the set-up and an occasional check for inaccuracies which may develop due to tool wear, passable threads can be assured.

Threads in nuts or tapped holes are extremely difficult to inspect to any degree of accuracy and are usually checked with Go and Not Go Plug Thread Gages.

Internal threads are normally cut with taps and, if they are to be held to any degree of accuracy, ground thread taps should be used. Taps are easily held to desired limits by projection inspection.

The crest of thread on taps is usually the first element to wear so they should be checked periodically and discarded when the crest is down to the minimum tolerance. With the assurance that the thread form and lead are correct, the diameter of the internal thread may be checked to the desired pitch diameter limits with the Go and Not Go Plug Thread Gage.

Taps are staged between centers on the projection machine to measure or compare the form on the screen. The shadow of a thread is superimposed onto the screen outline and with the micrometer or size blocks the table on which the tap is staged is adjusted laterally to measure the lead from thread to thread or over any desired distance.

It is also important to inspect the gage from time to time as the crest of the first threads are subjected to considerable wear.

For many years little attention was paid to the accuracy of taper threaded parts as the trade was satisfied to coat thread joints with lead or compound to prevent leaks.

The taper ring thread gage was used to insure that the part would screw into a given depth, but form, lead and taper received little attention.

The use of gases and liquids under high pressure has made more accurate pipe threads necessary as a leak-proof fit is required. To obtain a leak-proof joint with taper threads the lead and taper must be held to close limits and the thread form, including width of flat at crest and root, must be accurate on both male and female members.

The revised report of S. A. E. Standards, proposed by tubing fitting Sub-Division dated January 1936, is a commendable work. This report gives recommended tolerances on width of flat at root of external pipe thread and width of flat at crest of the internal threads. If these recommendations are followed in manufacture and inspection, a great advance toward securing suitable pipe thread fits will have been accomplished.

Nipples and plugs used for rough fitting work can be satisfactorily inspected with the conventional taper ring thread gage. High grade fitting should be inspected for form, lead, taper and diameter by projection. For this purpose the projection machine is equipped with a taper pipe thread staging fixture. See Figure No. 3. This fixture is made up of a taper thread female adapter into which the nipple or plug may be staged for comparison against the shadow of a master pipe thread gage on the screen. This adapter acts as a gage for controlling pitch diameter. If the pitch diameter of the part is oversize it will not enter the adapter, if undersize it will extend through.

A projection machine with attachments for direct measurements should be employed for checking the individual elements of form, lead, and taper on taper taps, plug thread gages, threaded ends with nipples and die chasers for cutting taper threads. See Figure No. 2.

Figure No. 4 shows a tap staged between centers before the projection lens and a chart having a double outline. These outlines vary in vertical position an amount of half the included taper over the distance desired to check. The chart shown in Figure No. 4 is drawn to check the taper in 1" of thread length. The tap is staged before the lens so that the shadow of a tooth "A" at the small end coincides with the lower outline "A" on the chart. If the shadow outline does not coincide with the chart outline, error in thread form is present.

The table is then advanced sufficiently to insert a 1" size-block between the table anvil and the micrometer. The shadow of a tooth "B" spaced 1" from the tooth first projected should now coincide with the upper outline "B" on the chart. If lead error exists, the shadow will be displaced to the right or the left of the outline. The exact amount can be determined on the micrometer by positioning the shadow central with the outline. If the shadow falls above or below the outline, error in taper is present. The amount can be determined by the graduations on the screen or by vertical adjustment if the machine is provided with a Vertical Measuring Attachment.

Form, lead and taper of die chaser teeth may be inspected in this same manner by staging the chaser in a suitable holder. Threaded ends of pipe nipples are staged on the nipple body in a V-Block when making these measurements.

In conclusion—a careful inspection of thread cutting tools is of utmost importance, as error in the cutting tools consumes a portion of the allowable tolerance. Reduced manufacturing tolerance throws an added burden not only on the manufacturing department but also on inspection, because a slight change in size or shape of thread will throw it outside of the prescribed limits.

The thread produced is never more accurate than the tool which produces it.

Threads As Threads

(Continued from Page 10)

order to obtain the correct amount of material in the operation, as it was imperative that the die be filled with nothing left over.

Wooden screws were used in carpenter's bench vises; possibly some of these are in use at the present time. It is really surprising how much power could be exerted with these without breakage or appreciable wear, although they did squeal their protest when revolved, load or no load.

A touch of historical romance is illustrated in the photograph shown of spool bracket and its belt adjusting screw, parts of a hand-made century-old spinning wheel. The screw and nut are made of wood and the threads are in a wonderful state of preservation considering the amount of use they have had. Threads are of 60 degree included angle form and the bottom of the male thread is sharp while the crest of thread is well truncated.

The pulley on the spindle is also mounted on a left hand thread cut on the spindle, which is made of steel, and a steel nut is inserted in the pulley.

This spinning wheel is a family heirloom and the writer has seen hundreds of miles of yarn spun on this wheel. It is still in perfect operating condition.

SPECIALIZED DIE HEAD AND TAP APPLICATIONS

By
A. F. BREITENSTEIN
Works Manager & Chief Engineer
Geometric Tool Company
New Haven, Conn.

THERE are times when threaded parts of unusual design run into sufficient volume to warrant the purchase of special die heads and taps. The majority of tools of this character are special in practically every respect with the possible exception of the chasers which in most cases are standard or slight modifications thereof. Like special tools in general, threading equipment is of necessity high in cost due, of course, to the fact that there is usually no volume required to absorb the costly machine set ups in manufacturing the various parts of the tools and in addition these parts must, in most instances, be machined from layouts, no jigs and fixtures being available. Extra precaution is also necessary from the issuing of the original order to the final inspection and testing of the tools. There are cases, of course, when standard tools can be modified to meet special requirements at a minimum cost.

A few unusual applications of die heads and taps will be given below. These are tools which have been made from time to time and represent some of the possibilities for handling special threading problems.

Fig. 1 shows a special die head arranged for cutting a very short thread close to a shoulder on bicycle coaster brake hubs. This die head is provided with a special tripping finger which contacts the

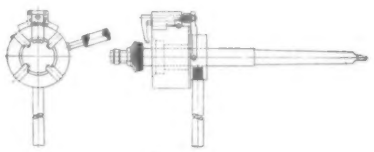


Figure 1.

shoulder and automatically releases the chasers from the work at the proper moment. By tripping the die head in this manner there is less danger of chipping or breaking the chasers, or stripping the threads in the event there is a variation in the distance of the shoulder from the end of the piece. It is obvious that a die head which is opened by means of an inside trip striking the end of the work could not meet this variable condition as effectively as the die head described above. Die heads of the pull off type are, of course, not suitable for close to the shoulder work of this kind. Fine adjustment is provided in this particular die head for very close to shoulder tripping. The head is slidably mounted on a shaft and is held against rotation by means of the straight handle which is shown projecting from the bottom side of the tool.

The work in this case is rotated and the die head is held stationary. This particular job was handled on a lathe, the work being mounted in a chuck and the die head in the tail stock by means of the taper shank arbor which also enters the work insuring alignment of the die head.

Fig. 2 shows a rather novel die head set-up. One die head is mounted within the other so that two threads can be cut simultaneously. The threads to be cut are of different

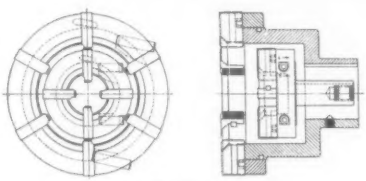


Figure 2.

pitch and diameter. The die heads are of the solid adjustable type and not self-opening which necessitates reversal of the spindles to withdraw them from the work. This installation was made on a machine which has reversible spindles, one revolving within the other. Both die heads are standard in design but the larger one was constructed with a special shank to fit over the outer spindle of the machine. The shank of the smaller die head fits into the inner spindle and is held in position by means of a draw in bolt.

Fig. 3. The requirements of this installation were that the die head should be very short. Fortunately it could be of the adjustable type and not self-opening which of course is very favorable in cases where the space is limited. The cam for con-

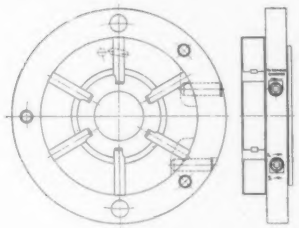


Figure 3.

trolling the chasers is fully enclosed within the flange of the tool which is securely bolted in the rear to the body of the die head. Adjusting screws for varying the diameter of the threads to be cut are placed in the flange as shown. One of these must be partially backed off to permit rotation of the die head cam when removing the chasers. The die head is secured to the flange of the machine spindle by means of three bolts and two dowel pins, holes for which appear on the face of the flange.

Fig. 4 represents a special die head with the usual locking mechanism omitted so that the tool can be operated by means of a separate mechanism provided on the machine. The die head is arranged to cut a reverse taper thread on the work, that is, the large diameter of the thread is toward the die head and the chasers must move inwardly as the thread is being cut.

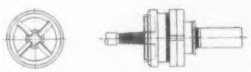


Figure 4.

Threading was done in this manner so that a shallow hole could be drilled in the piece at the one setting. This particular type of die head is provided with an outside operating sleeve which moves axially on the body of the tool. A forward motion of the sleeve forces the chasers inwardly cutting the taper.

The rate of movement of this operating sleeve must of course, be coordinated with the taper being cut. At the conclusion of the cutting of the thread the operating sleeve is

(Continued on Page 36)

GROUND THREADS OFFER MANY ADVANTAGES

By
GILBERT STEWART
Engineer Thread Grinder Division
Ex-Cell-O Corporation

WHEN mass production brought about the need for uniformity and interchangeability, many methods of machining threads on production parts were available. But there was no production method of correcting the distortion caused by subsequent heat treatment. Tolerances, therefore, had to be increased to such an extent that it was impossible to maintain the necessary close fit on mating parts.

Lapping was tried, in an effort to produce accurate parts and gauges. But lapping did not restore concentricity or straightness, and often destroyed the thread form. Its only advantage was in correcting certain oversize conditions.

Since the first thread was cut, it had been a problem to maintain that elusive threads-per-inch, or lead. It was easy to specify so many threads per inch, but not so easy to hold that number in an inch. Using a die head and a set of chasers, for instance, there was no assurance that the lead would be accurate, particularly if the thread was longer than the chasers, or if the stock being cut was too hard or too soft. Assuming, however, that the lead was correct, it was almost certain to be changed by heat treatment.

Few men, unless their work has brought them into intimate contact with screw threads, appreciate the troubles that arise when a given number of threads are specified in .9995" or in 1.0005" instead of in 1.000"—in other words, when there is a lead error of .0005".

For instance, suppose we had a correct 1"-8 U.S.S. ring gauge 1" thick, made to basic pitch diameter specifications. Suppose, then, we had a plug gauge with the proper form but with a lead error of .0005" per inch. Unless the plug gauge was made aproximately .0008" smaller in pitch diameter than the ring gauge, it would not screw entirely through the ring. This is because, with this lead error, very few threads are in contact, as shown in Fig. 1.

Another difficulty was encountered when each of two mating threaded parts had the correct lead,

Above: Continuous and multiple, internal and external, right or left hand threads, with pitches from 1 to 40 per inch, in sharp "V," U.S. Standard, Acme and modified Buttress thread forms—these are produced in the Ex-Cell-O Precision Ground Thread Department.

but when one or the other part had an incorrect thread angle. In this case, the threads contact only on the edges, as shown in Fig. 2.

In addition there was, of course, the difficulty of incorrect size. But — and this is the point — the use of an accurate Go-No-Go gauge made apparent whether or not the part being checked would screw into the

Figure 1. Effect of lead error.

gauge. It did not, however, give any indication of why, if it did not screw in. Thread form, lead, or size — any one or more of these elements might be at fault. Accurate Go-No-Go gauges were of little use unless the parts were accurate in all respects save one: size.

The demand for accurate gauges however, brought about the development of a machining method that was at once available for producing more accurate parts.

What machine tool units were at hand from which to develop the thread grinder?—principally the lathe and the grinding spindle. The lathe, with its work head and feed screw, was adequate to drive the work in proper relation to the grinding wheel. But the spindles available at that time were not accurate enough to take large diameter wheels. The wheels that could be used were too small to give sufficient wheel life. Thus they did not grind an acute thread root.

It wasn't until the precision ball bearing wheel spindle was developed that accurate thread grinding really got under way. Spindles having minimum end and radial play permitted the use of large wheels, and of large wheel diameters, and made it possible to produce threads, accurate not only as to size, but as to thread form and lead. Further refinements were, and are being made in the construction of the thread grinder, so that it will now grind many thread forms accurately on a production basis.

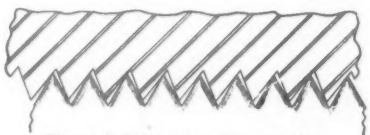


Figure 2. Effect of angle variation.

The thread grinder as now developed offers more, however, than a production method of correcting the

Typical of threaded parts that can now be ground is this aircraft driving barrel. The internal ground thread is $3\frac{1}{2}$"—24, and the external ground thread is $3\frac{5}{12}$"—24.

distortion caused in threads by heat treating. The outstanding feature of the precision thread grinder is its ability to finish grind fine threads from hardened or heat treated solid blanks.

To fully appreciate the advantages of ground threads, let us first analyze the functions of a thread. Possibly the first parts that come to mind in conection with threads are a nut and bolt. Now, the size of the bolt must be ample for the job it is to do; one of the fundamental rules an apprentice is required to learn, is that a bolt is no stronger than its smallest diameter, which is the root of the thread.

In the development of the automotive and aircraft industries, this root diameter became a greater factor, as the need grew for smaller and lighter parts, without sacrifice of strength. Consequently the S.A.E. series of threads was introduced. In time the ⅜"-24 S.A.E. bolt for instance, replaced the ½"-13 U.S.S. bolt.

Since taps with hardened and ground threads will tap fine threads with less effort, we arrive at the advantages of Precision Thread Grinders: smaller holes to drill and tap, with consequent saving in time, and smaller bolts carrying the same load, with consequent economy of space and weight. Assembly is simplified and performance of the product is increased.

Ground thread taps should be used in all places where accuracy of threaded parts is important. Lead troubles are practically eleminated, while thread form and pitch diameter is maintained within extremely small tolerances. Threads that are cut before hardening are always a hazard in the furnace; special attention is required in hardening to prevent cracking or burning of the thread crests, and even then there is no positive assurance of success. It is much simpler to harden the blank and then grind the threads from the solid. This assures extreme accuracy both in form and lead because all distortion of the metal has taken place before the thread is ground.

Contrary to general belief, the time required to grind a tap is no more than was required by older methods, because the back-off is ground at the same time. This produces a tap that cuts equally on all flutes, also, a tap that has longer life. Considered on a production basis only, ground thread taps often give more tapped holes per dollar invested. Even when this is not so, the uniformity of the product and the reduction of assembly troubles make the ground thread tap, everything considered, most economical.

Possibly no industry more fully appreciates ground threads than the aircraft industry, with its many requirements as to size and finish. Take, for instance, an aircraft engine crankshaft. At almost any stage in machining it represents an investment of several hundred dollars. Modern thread grinders are so accurate and dependable that what would have been considered a very delicate operation, now becomes one of ease and assures an accurate, highly finished thread. We also find the aircraft industry using taper threaded studs, which are as easily ground as straight threads.

Precision thread grinders using long life, large diameter wheels, precision ball bearing spindles, and oil coolant, hold lead tolerances not to exceed .0002" per inch, pitch diameter tolerance of .0002". They will grind fine threads directly from heat treated blanks or will finish grind coarser threads after heat treatment.

For Your Standards Binder or File

Turn to page 25 of this issue. Tear out this page, punch or file for future reference. The data contained on this page is of value to every manufacturing executive.

VARIOUS THREAD FORMS AND THEIR USES

By

M. B. Henneberger

Landis Machine Company

IN A discussion on various thread forms, one must, of necessity, limit the scope of discussion to comparatively few of the great number of standard and special thread forms. The Landis Machine Company alone has furnished Chasers for cutting approximately 1800 different thread forms which clearly illustrates why such a discussion must be limited.

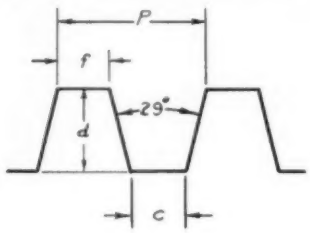


Figure 1.

Prior to the advent of the lathe, threads were crude and little attempt was made to hold them to a definite form. Therefore, the few threads that were cut, prior to the using of a lathe for "chasing," are of little value, other than for the history of mechanics.

Of the threads in most common use today, the "V" thread, so called because of its sharp "V" crest and root, was at one time the most generally used. The "V" thread is, however, rapidly passing out of use as it is an expensive thread to produce under present day production requirements. It is now used only occasionally for Boiler Studs, Stay Bolts, Packing Glands, etc.

The U.S. Form, as is now used in the N.C. and N.F. series, is an outgrowth of the "V" thread. The U.S. Form thread has a 60° included angle, the same as was used on the "V" thread, but the root diameter is increased and the outside diameter decreased, by the use of a flat on the crest and root equal to ⅛ of the pitch. This form materially increases the strength of the thread, makes it easier to machine, and insures a more serviceable thread that will stand more abuse, and that is more economically produced.

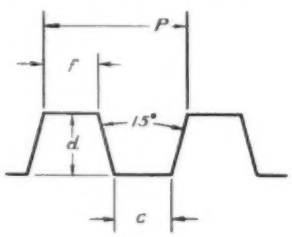


Figure 2.

The U.S. Form thread is ideally suited for general usage where a combination of average strength and wearing qualities are required. Machine Bolts, Cap Screws, Studs, — the greater percentage of threaded parts, employ the U.S. Form thread to a good advantage.

Due to the general usage of the U.S. Form thread, the need of a standardization of screw threads necessary to industry, and the elimination of unnecessary sizes, Congress appointed a Commission in 1918 to investigate and promulgate standards of screw threads. Many prominent Engineering Societies, such as the American Society of Engineers, and the Society of Automotive Engineers, as well as the larger manufacturers of thread cutting machinery, and the manufacturers of specialized threaded parts, were the chief influence in bringing about this Commission.

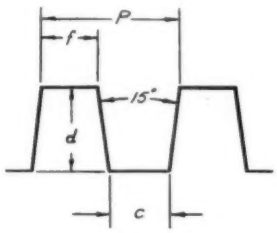


Figure 3.

The National Screw Thread Commission began to function in July 1918, and, largely through their efforts, a standardization of screw threads was brought about. At the present time the Sectional Committee on Standardization and Unification of Screw Threads is carrying on the work of the N.S.T.C. and, although there have been changes and modifications of the different classifications they still remain basicly the same.

Under the specifications as set up by the Sectional Committee on Standardization and Unification, Screw threads are divided into four classifications based on the use or performance of the material or product under which it is to be used.

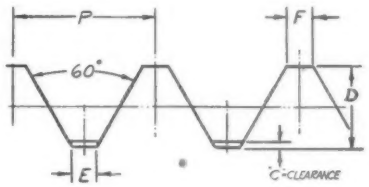


Figure 4.

Class 1 fit is recommended where shake or play is not objectionable and clearance between the mating parts is essential for rapid assembly. Class 1 fit specifies that the maximum pitch diameter of the screw must be smaller than the minimum pitch diameter of the nut.

Class 2 is a much closer fit, suitable for the greater percentage of interchangeable threaded parts, is considerd a high quality commercial screw thread product. In the class 2 specifications, the pitch diameter of both the screw and the nut have a common basic value and, therefore, the fit may vary from a fit with no play to one that has a slight shake.

Class 3 specifications are similar to Class 2 in that the fit may vary from one that has no play to one that has a slight shake, but the tolerances allowable for Class 3 are much less than that of the Class 2 specifications. The Class 3 specifications represent an exceptionally high quality of commercially threaded screw products and is rec-

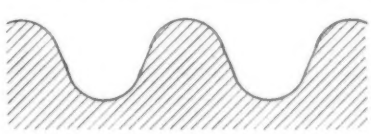


Figure 5.

commended only where the continual checking of tools and products is warranted.

Class 4 specifications are intended only for very unusual requirements and are frequently termed a "selected assembly" type of fit. The

Figure 6.

Class 4 fit is not generally accepted as being adaptable to quantity production.

Complete specifications of these classifications for all diameters and pitches of Screw Threads may be obtained by referring to the report of the National Screw Thread Commission or to the American Standard of Screw Threads as published by the Sectional Committee on Standardizations and Unifications.

There are, of course, many instances where increased strength and other special properties require a thread of different form. Although the use of special thread forms is abused to a large extent, there are a few forms that have a recognized value and should be used when the necessity demands.

Where strength, severe side thrust, and wear are important factors in a thread, the Acme thread is usually specified. A common fault is often found when specifying such threads for small diameter screws. The depth of the thread and the coarse pitch make it impossible to cut Acme threads with a die as the material is not strong enough to withstand the torque of machining. Likewise, Acme threads are frequently specified for threaded parts such as Jack Screws, where the screw has a tapped hole for the inner screw. Necessity demanded a modified thread form for such purposes.

Figures 1, 2, and 3, show the various forms of modified Acme and modofied Square threads that are in common use for Jack Screws, Valve Stems, Vise Screws, etc. The modified form shown in Figure 1, offers a suitable form for the majority of uses to which Acme threads are applied, and has much easier machining possibilities than the standard Acme thread. The modified depth greatly increases the strength of the cutting teeth on the dies and taps and reduces the possibility of chipping the teeth, thus helping to keep tool cost to a minimum.

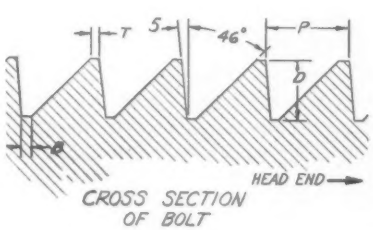


Figure 7.

A full square thread is seldom used, and it is generally accepted that this form cannot be successfully cut with dies. The modified forms shown in Figures 2 and 3 will, in most cases, answer the purpose of a square thread.

The modified 60° thread, shown in Figure 4, is commonly used for fitting up bolts, etc., and is very suitable for this class of work as the thread will stand considerable abuse and the coarse pitch permits quick assembly or dismantling.

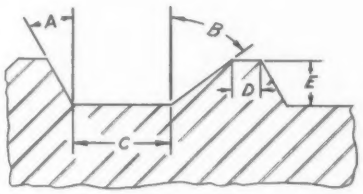


Figure 8.

For many years, almost every structural steel company used a standard of their own for fitting up bolts.

The "Rope Thread" illustrated by Figure 5, has a rounded crest and root, and is made either with or without flat side wall surfaces. This thread form has many advantages in strength, wearing qualities, and easy assembly, and is used extensively in foreign countries for car couplings, etc. A thread form, very similar to the rope thread, is used considerably in this country for insulating pins made both of wood and metal.

The Dardalet thread, shown in Figure 6, combines qualities of strength with nut-locking qualities that have been found to be very efficient when applied to such uses where lock washers or other means must be employed to prevent the nut from working loose. It has been used very successfully as a rivet bolt in structural work in places where a rivet cannot be used.

Figure 7 gives complete specifications of the modified Harvey Grip Thread. This form is similar to the Buttress form in many ways. The side angles have been changed and the sharp crest and root have been eliminated by the use of a flat. The flat on the crest is slightly wider than the flat at the root in order to obtain clearance.

Harvey Grip and Buttress Threads are used, to some extent for Vise

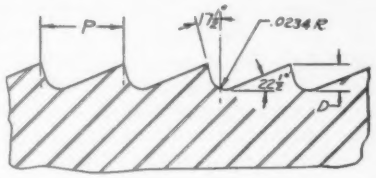


Figure 9.

Screws and similar applications where the thrust is on one side of the thread, but has largely been replaced by modified Acme form because of its easier machining properties.

Skein, Fetter Drive, and Lag Screw threads, illustrated in Figure 8, 9 & 10, are used on Lag Screw Bolts and for other Bolts where the threads of the bolt are forced into a plain hole, thus forming its own retaining nut. Lag Screw threads were produced for many years with no definite specifications for thread form. A standard form was developed by Landis Engineers that is now almost universally accepted as standard for this type of thread.

This outline of thread forms and their uses covers only a fractional part of the great number of thread forms in general use today. In selecting a proper thread to use there are a number of questions that must be settled, and, even though considerable thought is given to the subject, there is a serious danger of specifying an incorrect thread form.

For example, a quick acting screw may be required for elevating or adjusting purposes. The first ten-

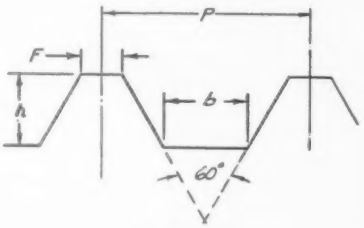


Figure 10.

dency may be to specify a 4 pitch modified Acme thread. It is true that modified Acme threads are fairly simple to machine, impart a rapid action to a nut and may serve the purpose very well. With further investigation, however, it may be found that a ⅛ pitch — ¼" lead 60° angle

(Continued on Page 49)

PRODUCTION PERSPECTIVES

News of Mass Manufacturing from Everywhere

Midwest

Col. Leonard P. Ayres, vice president and economist of the Cleveland Trust Company, Cleveland Bank, **is optimistic about** the immediate future of **business despite the action of the stock market and the recent decline in business activity.**

In his monthly review of business released October 15, Col. **Ayres said** that **fears that the current decline in business and stock market values might develop into a real depression are probably unfounded** . . . . "The chief reason why these fears are probably unfounded is that we have not yet made a full recovery from the old depression," he stated. Col. Ayres also pointed out that **more important classes of industrial production are still below their normal computed levels.** Discussing the stock market, he said the decline in stock prices reflects a realization by investors that **"our new managed economies are not going to produce the vigorous progress of recovery to prosperity which many had anticipated last year and last spring."**

Our good friend and A.S.T.E.'er, **A. C. (Chet) Goddard,** for many years connected with Cleveland Tractor, in Cleveland, has **joined** the **Wyatt Sales** Company in the capacity of Sales Engineer. The "infant" **air conditioning** industry **is growing into a $100,000,000 business,** according to sales figures of American air conditioning corporations which indicate that **1937 sales will actually pass this mark and double the industry's $50,000,000 total of last year.**

This 100 per cent increase in sales has **followed upon the development** of **better and less costly equipment,** more exact selection of equipment and a greater realization among business and individuals that air conditioning means better work, better play and better living in general. There is an **obvious swing** in air conditioning sales **from "industrial" to "comfort"** applications, with heavy business being reported in the home field, particularly in new homes.

Construction is well under way on the **Ohio Crankshaft Co.'s new plant** at E. 42nd Street and Harvard Avenue, Cleveland. Located approximately one mile from the present plant, **the new plant** will **provide 75,000 square feet** of floor space. **The cost** of the land and building totals **$300,000. New equipment** to be installed **will cost** an additional $400,000. Included in the new plant is a $100,000 laboratory for research in the company's patented method for surface-hardening crankshafts and other machinery parts by electrical induction.

American Rolling Mills Co. has appropriated $2,000,000 to improve the company's **plant at Middletown, Ohio.** The board recently appropriated a similar sum for improvements at the Butler, Pa., plant. **These appropriations** carry into effect additional **details to a $12,000,000 program decided upon last spring.**

Vacuum Systems, Inc., has acquired and moved to Cleveland all assets of the Crescent Pump Co. of Detroit. The **new company will manufacture and service vacuum pumps and accessories.** The engineering services of **William A. Hatcher,** inventor of the Crescent pump, have **been retained.** Officers of the company are Louis H. Mesker, president; B. E. Hathaway and H. W. Dorsey, vice presidents, and W. L. Holloway, secretary. **Purchase of a 40 acre tract of** land **just outside the limits of Detroit** has been **announced by Carboloy Company,** Inc., Detroit, Michigan, — manufacturers of Carboloy cemented carbides.

It **is planned to build a factory** on this site **to manufacture cemented carbide tools, dies and wheel dressers.** No details as to the size or nature of the structure are available as yet, as plans for the factory have not been completed.

The appointment of **Virgil W. McDaniel as General Sales Manager** is **announced by The Eclipse Counterbore Company,** of Detroit, Michigan, specialists in the design and manufacture of interchangeable end cutting tools. He succeeds J. E. MacArthur, recently resigned.

McDaniel, who has been connected with the Chrysler Corporation — Parts Division — in special sales work during the last two years, has a large acquaintance in the East where he acted in managerial capacity for some time with Dewey & Almy Chemical Company of Cambridge, Massachusetts.

He is a graduate of Massachusetts Institute of Technology and during the last several years he has specialized exclusively in industrial sales management and promotional activities.

Mr. B. L. Diamond has been appointed **Detroit Representative** for **Modern Tool Works division of Consolidated Machine Tool Corporation,** Rochester, New York, **succeeding Ford R. Lamb,** who is now Executive Secretary for the American Society of Tool Engineers. Mr. B. L. Diamond is well known in the Detroit area, having been for years engaged in the manufacture, design and sales of tools in this territory. The office will be maintained at 6560 Epworth Boulevard.

The assets and good will of the Hutto Machine Division of the Carborundum Company have been sold to the Micromatic Home Corporation, of Detroit, Michigan, and the **Barnes Drill Company, of Rockford, Illinois,** and the business will be subdivided by the purchasers. Barnes Drill Company will absorb that part of the business relating to the manufacture, sale and service of honing machines and gear lapping machines, and the **Micromatic Hone Corporation will take over the manufacture, sale and service of honing tools and tool replacement parts.**

The plant of the Hutto Machine Division, which is located at 515 Lycaste Avenue, Detroit, Michigan, and **has been closed by a "sit-down" strike** during the last five weeks, **is being reopened under the management and name of the Micromatic Hone Corporation,** Hutto Division, and full operations were resumed on Monday morning, October 25th, the strike having been settled on terms favorable to the workers and the new management. No reduction of the present personnel of the Hutto Division is anticipated by the new owners.

East

Reliance for **brisk manufacturing activity** this quarter **rests particularly on automobile production,** which is being built up, week by week, by motor car companies and brings substantial releases of parts

(Continued on Page 42)

CHAPTER DOINGS

BRIDGEPORT

E. H. Ebelhare, Chapter Publicity Chairman
323 Trumbull Avenue, Nichols, Conn.

Bridgeport Chapter's October meeting was held at the Barnum Hotel on Thursday, October 14, preceded by an informal dinner. Chairman John Bullard opened the meeting at 8:15 P.M. at which time he read a report from National headquarters; C. A. Dundore, Sec'y of the local chapter read the national secretary's report on the receipts and distributions of funds received. It was good to note that none of the chapters are in the red as far as the credit with the home office is concerned. Showing that the dues are coming in. The Sec'y read the Society's report, showing a balance of $65.27. Two new applications for membership were received, Joseph Zelinsky from Singer Co., and George Cunningham from Bullard Co.

Ben Page, Chairman, introduced Mr. H. G. Clark, of the local branch of the Socony-Vacuum Oil Co. He gave a short talk followed by a talking movie, entitled "Inside Story," covering the subject of Industrial Lubrication. Ben Page followed this with a discussion period; there were some very interesting questions asked and answered. It would be more interesting to all, if the members would come out and take a more active interest in this discussion period. There is no better place than these meetings where we could practice our public speaking, where we engineers are not too well qualified.

We want to congratulate the Rockford engineers upon taking a fine step in organizing a chapter; the local members who moved here from Rockford by the Underwood Elliott Fisher Co. in connection with the Sundstrand Adding Machine Co., were glad to read the news and pass comments on the members who were active in this organization.

The Bridgeport Chapter of the A.S.T.E. is thinking of having a dance for the winter season so that the opposite sex will give the men one night off a week to attend their meetings, and not ask too many embarrassing questions as to where we go after meetings.

Baltimore Now has A.S.T.E. Chapter No. 13

The Baltimore Chapter 13 of the American Society of Tool Engineers was organized and chartered, October 13th at Baltimore, Maryland. The organization meeting was held at the Longfellow Hotel, 2 West Madison Street, Baltimore, and was preceded by a dinner which was well attended. A telegram of congratulations from Rockford Chapter 12 was read to the meeting and was appreciated by the new Baltimore group.

An Election of Officers resulted in the following: Mr. Nils H. Lou, of the Glenn L. Martin Company as Chairman; Mr. Carroll L. Vansant of the Black & Decker Mfg. Co., Vice-Chairman; Mr. J. Harvey Chandler, of the Glenn L. Martin Co. as Secretary; Mr. John P. O'Connor, of the Glenn L. Martin Co. as Treasurer. The work of organizing the Baltimore Chapter fell largely on a committee composed of Nils H. Lou, J. Harvey Chandler, and Harry F. Kniesche. After the organization of this chapter was completed a general feeling existing was: "Why had we not done this before?" This meeting was addressed by C. Ray Brunner, National Secretary of the American Society of Tool Engineers, and Ford R. Lamb, Executive Secretary. Mr. Conrad Hersam of the Industrial Consulting Engineering Company of Germantown, Pennsylvania was present at this meeting and is interested in starting a chapter in Philadelphia as soon as possible.

BUFFALO

O. W. Winter, Chapter Publicity Chairman
38 Lowell Road, Kenmore, N.Y.

The Buffalo Chapter, at their October 11th meeting, were guests of the Worthington Pump Machinery Co. and enjoyed a very interesting program. The evening started with a harvest style chicken dinner in the Company's cafeteria and everybody ate as much as they could hold. Following this, the group was conducted through the plant on a very interesting inspection trip by very competent guides and we, among many other things, saw the Tool Engineering work done by our good friend and member, Bill Weinrich. There was, also, a trip through the foundry for those interested in foundry work.

After the trips, there were three sessions as follows: Mr. J. F. Hecking, Asst. Manager, Engine Application, Diesel Engine Division, spoke on Diesel engines. We learned a lot of things that we had never known before in this connection. Following this, Mr. E. M. Paullin, Consulting Engineer on Compressors, spoke on Compressors and showed us some of the company's latest developments in this line which were very interesting. Mr. W. W. Kemphert, Sales Manager of the Multi "V" Drive Division, then spoke on Power Transmission and the use and application of Multiple "V" Belt Drives. It was an interesting talk which not only covered a great deal of ground in connection with "V" Belt Drives, but also included some demonstrations and distribution of literature on the subject.

The meetings committee had a problem on their hands. There were about 120 members and guests attending and we had expected about 80, but we all made the best of it and got along in great shape. This meeting can be chalked up as another milestone in the progress and growth of the Buffalo Chapter that is promising to be a really worthwhile and significant thing.

Given below are the new committee appointments for this chapter. Meetings Committee—Mr. T. Brunn, Chairman, Mr. H. O. Donath, Mr. Geo. Keller; Membership Committee — Mr. Art Whistler, Chairman, Mr. O. A. Donath, Mr. C. M. Fuller, Mr. A. B. Hall; Publicity Committee — Mr. O. W. Winter, Chairman, Mr. Geo. Keller.

CHICAGO

Raymond Weeks, Chapter Publicity Chairman
818 Junior Terrace, Chicago

The regular monthly meeting of Chicago Chapter was called to order at the Machinery Club at 8:00 P.M. October 11, 1937, by the Chairman, F. W. Creager, who spoke to the members and guests as follows:

"I am very glad to welcome all you fellow members this evening, although I think our crowd is not as big as it really should be, especially after having a long summer vacation. After the slides which are to be shown this evening, a short business meeting will be held for mem-

Newark, New Jersey to Have A.S.T.E. Chapter No. 14

An open invitation is extended to all manufacturing executives, Tool Engineers, of Northern New Jersey, New York City, Bronx, Brooklyn, nearby Long Island points, Queens, etc., to attend the organization meeting of Northern New Jersey Chapter No. 14 of the A.S.T.E.

November 1, 1937
Newark, N. J., at the Essex House
1000 Broad Street (Opp. Lincoln Park)
Dinner: 6:30 P.M. — $1.50 Per Plate
Meeting: 8:00 P.M.

bers only. I shall have to ask the guests to wait outside in the lobby for their friends who are members and I hope this meets with everyone's approval. There are quite a number of questions to be brought up at this meeting, particularly about the outing which we did not have during the summer. As the chairman of the entertainment committee is not present right now, I am afraid nothing much can be said in regard to the outing. As I have nothing further to add, I shall turn the meeting over to Mr. Ives."

Mr. Ives: "Gentlemen, I want to welcome you all back after our summer vacation and I want to tell you that I am very much disappointed about not having that outing. If there is no objection on the part of Mr. Creager, I would like to have each man present, stand up and tell us his name and place of business. Let's get acquainted all over again."... Each man present stood up and stated his place of business and his name ... "Now I would like to re-introduce our officers for the year: Mr. Creager, Chairman; Mr. Wilson, Secretary; Mr. Bachner, Treasurer. Any men present, who are not members, please report to Mr. Blu, our membership chairman. I am going to ask Mr. Hyatt to stand up. He was chairman, for two years, of the Racine Chapter. Mr. Hyatt, how would you like to transfer your membership?"

Mr. Hyatt: "I think I shall consider it." (Applause).

Mr. Ives: "Last year we held our first meeting in about December. Since that time we have had some very fine speakers present at our meetings. We heard a man who represented The Chicago Surface Lines and he gave us a very interesting talk on the new Madison Street-cars. We also listened to a Mr. Richman who told us about the fare registers installed on the new street-cars. These talks were followed by quite a number of varied meetings, mostly about Machine Tools.

"We heard a very fine talk on Inventiveness, and a Mr. Kaztimier gave a very fine talk on Molded Products. The scheduled speaker from the Elgin National Watch Company could not be present on the designated evening but he sent one of his 'buddies' who proved to be very interesting.

"We are very much interested in knowing just what type meetings you men prefer. In the past you have been listening to Machine Tools for most of the meetings, and we will be willing to talk 'shop' just as long as you are willing to listen to it. If you desire to hear something else, don't fail to let us know. We want to give you something interesting to listen to.

"On November 8, we shall have the pleasure of listening to Mr. William A. Hart. Mr. Hart wrote a very fine article in "The Tool Engineer" about broaching. I am sure all of you gentlemen have read it. Mr. Hart's lecture will be on the subject of broaching and its title is 'When, Why, and How?' Tonight I have the extreme pleasure to introduce to you Mr. Buell and Mr. Chellstrom of the Sundstrand Machine Tool Company. We will be favored with a lecture, lantern slides, and moving pictures."

Mr. Buell gave an extremely interesting and instructive illustrated lecture on the Sundstrand plant and a few examples of the more unusual machines his company have made. In conclusion he extended an invitation to visit the Sundstrand plant in Rockford.

A short business meeting of the Chapter followed.

CLEVELAND

R. B. Oswell, Chapter Publicity Chairman
1585 Hawthorne Drive, Euclid, Ohio

Cleveland Chapter A.S.T.E. meeting Tuesday evening, October 12, at the Colonial Hotel was well attended, the speaker of the evening being Mr. Clinton Johnson, of Pratt & Whitney Company, who spoke on gages. The subject was very well covered from the more common types of gages to what we might call electrically operated semi-automatic gages of which Mr. Johnson showed a number of lantern slide illustrations. We wish to take this opportunity to thank Mr. Johnson for his fine talk and hope we may have the privilege of hearing him again.

Two of our Cleveland Chapter members have recently been elected to the National Board of A.S.T.E. and we wish to congratulate "Chet" Goddard and "Rudy" Fintz; we feel they are deserving and well qualified for the job.

Several of our members employed at the National Acme Company took in an inspection trip at the Timken Roller Bearing Company plant at Canton, Ohio, and reported a very interesting trip.

Our November 8 meeting will be at the plant of the Cleveland Graphite Bronze Company with dinner at 6:30; everyone be sure and attend as this promises to be a very interesting meeting.

DETROIT

R. M. Smith, Chapter Publicity Chairman
12775 Greenlawn Avenue, Detroit, Mich.

Thursday, October 14th, found us again gathreed as a group to be entertained by the Great Lakes Steel Corporation at their plant. We filled their auditorium and opened our business promptly at 6:45 P.M. Evidently our Chapter boasts of only one pianist to play our Theme Song. Who will volunteer to play at our next meeting? This was our Semi-Annual Meeting, National in character and a report of the National Officers as to their stewardship of the affairs of this society was read.

Our Chairman, Mr. Staples, explained that it costs around $30.00 to $40.00 for expenses when we have dinner meetings, and that the Hotels have raised their prices to $1.75 per plate. The fellows voted against paying that price. Incidentally, Detroit members, your dues are very, very acceptable at this time. Partial payments will help, too. Suggestions as to meeting places will be welcomed.

The new members of the Board of Directors were named. Our Society's growth shows (14 chapters now), and our President, Mr. Frank A. Shuler, closed his report by saying, "It has been a lot of work, a lot of pleasure, and very instructive to be President of our Society, and I wish to extend my sincere personal regards to each and every member, and to wish the best of luck and success to you and to your society." The National Secretary's and Treasurer's reports were read and explained how, where and why our income is used. Thus ended our business meeting at 7:15 P.M.

Our Secretary, Mr. Floyd W. Eaton, introduced our host for the evening, Mr. J. P. Gatherum, Director of Personnel & Safety, who welcomed us to The Great Lakes Steel Company's plant, and then introduced Mr. Julius Clauss, their Chief Engineer. Mr. Clauss explained how, in 1900, 1/11 inch was about as close as they measured, and that for adjustments a sledge was used and anything that could not stand this adjustment was too light for practical use. A bolt ¾" in diameter was the smallest they ever used. A few statistics piled end to end were mentioned and credit given Mr. Gatherum for the remarkable strides he had made in protecting the steel worker in his hazardous calling.

(Continued on Page 28)

RYERSON *Certified* STEELS

RYERSON CERTIFIED STEELS

Meet Definite Specifications—Pass Rigid Inspections

RYERSON CERTIFIED STEELS are the result of many years of planning—developing new specifications, new methods of control and complete readjustment of stocks. Definite specifications and rigid inspection systems now assure the qualities most desired in each class and type of material. Special handling and warehousing methods protect these qualities and make possible immediate shipment of every requirement—large or small.

Let us give you the complete story of Ryerson *Certified* Steels. Write for booklet H8.

JOSEPH T. RYERSON & SON, Inc.

Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON STOCKS INCLUDE:

- Alloy Steels—Tool Steels
- Heat Treated Alloy Steel Bars
- Stainless Steel
- Hot Rolled Bars—Hoops and Bands
- Cold Finished Shafting and Screw Stock
- Extra Wide Cold Finished Flats
- Beams and Heavy Structurals
- Strip Steel, Flat Wire, etc.
- Channels, Angles, Tees and Zees
- Rails, Splices, Spikes, Bolts, etc.
- Plates—Sheets
- Boiler Tubes and Fittings
- Welding Rod—Mechanical Tubing
- Rivets, Bolts, Nuts, Washers, etc.
- Reinforcing Bars
- Babbitt Metal and Solder

RYERSON STEEL-SERVICE

NOVEMBER CHAPTER MEETINGS

BALTIMORE

November 8, 1937 — Longfellow Hotel, 2 West Madison St., Baltimore. Dinner 6:30 P.M. Technical Session 8:00 P.M.

Speaker: R. E. W. Harrison, V. P. Chambersburg Engineering Company.
Subject: "Modern Drop Forging in Relation to Machine Shop Practice."

Please make reservations early by calling Vernon 5353.

BRIDGEPORT

November 11, 1937 — Hotel Barnum, East Room. Technical Session 8:00 P.M.

Speaker: Mr. Lyod Raymond, the Singer Manufacturing Company. Subject: "Heat Treating."

BUFFALO

November 8, 1937 — Buffalo Orpheus Society, 432 Franklin Street, Buffalo. Dinner 6:30 P.M. Technical Session 8:00 P.M.

Speaker: Mr. J. R. Weaver, Chairman Pittsburgh Chapter A.S.T.E.; Director of Equipment, Inspection and Test, Westinghouse Electric & Manufacturing Company, East Pittsburgh.

Those who may be unable to attend the dinner are urged to come for the technical session at 8 o'clock.

CHICAGO

November 8, 1937 — Machinery Club, 571 W. Washington Blvd., Chicago. Dinner 6:45 P.M., $1.25 per plate. Technical Session 8:00 P.M.

Speaker: Mr. William A. Hart, Chief Engineer, Colonial Broach Company, Detroit, Michigan.
Subject: "Broaching: When, How and Why."

To friends and members attending only the technical session, a charge of $0.25 will be made.
Mail dinner reservations to Willard T. Wilson, Chapter Secretary, 7428 Euclid Avenue, Chicago, Illinois — telephone MIdway 9853. RESERVE EARLY.

CLEVELAND

November 9, 1937 — Not a dinner meeting. Inspection Trip through Cleveland Graphite Bronze Company plant, 880 E. 72nd St., Cleveland, Ohio. Mr. Ben F. Hopkins, President and Founder of the Company will give an address. Trip starts promptly at 7:00 P.M. Only 150 have been allowed for, so make your reservations early by calling C. V. Briner, Chapter Secretary, Cherry 8034.

DETROIT

November 12, 1937 — Joint Meeting with Toledo Chapter in Detroit — Hotel Tuller. Dinner 6:30 P.M., $1.50 per plate. Technical Session 8:00 P.M.

Speaker: Mr. C. W. Spicer, V. P. Spicer Mfg. Co., Toledo.
Subject: "Standardization of Small Tools."

Speaker: Mr. A. L. Brown, Economist, Investors' Syndicate.
Subject: "The Dark Spot in Industry."

Members — Please note change in date to FRIDAY, Nov. 12.

Make reservations early with ticket sellers or by calling A.S.T.E. Offices MAdison 7960. Guests will be welcome.
The operation of the Detroit Chapter is conducted by the elected officers and heads of the various committees at regular business meetings held on the third Thursday of each month, 7:00 P.M. in the National Offices, 5928 Second Blvd. Chapter members are cordially invited to attend these meetings for the purpose of learning of, or to participate in, the conduct of its business.

HARTFORD

November 29, 1937 — City Club. Dinner 6:30 P.M. Technical Session at Gas Co. Auditorium at 8:00 P.M.

Speaker: P. J. Horgan, Engineer at General Electric Co. River Works. Subject: "Typical Examples of Welding."

MILWAUKEE

November 11, 1937 — Republican House, Colonial Room. Dinner 6:30 P.M. Technical Session following.

Speaker: George Fobian, Oil Gear Company, Milwaukee.
Subject: "Hydraulic Fittings and Surface Broaching."

Speaker: E. E. Houston, Allis-Chalmers Company.
Subject: "Blackboard Discussion on Gearing Problems."

Make Reservations Early — Dinner $1.00.

PITTSBURGH

November 12, 1937 — Roosevelt Hotel, East Room, Pittsburgh. Dinner 6:30 P.M., $1.50 per plate. Technical Session 8:00 P.M.

Speaker: Mr. Millard Romaine, Manager Engineering Service Department, Cincinnati Milling Machine Company, Cincinnati.
Subject: "Fundamentals in the Application of Milling, Grinding, Broaching and Lapping."
Reservations: Please note change in meeting place to Roosevelt Hotel. Call Miss Davenport, Valley 511 or Brandywine 1490, before Friday noon, Nov. 12.

ROCKFORD, ILLINOIS

November 19, 1937 — Barber-Colman Company Plant, Rockford. Dinner 6:15 P.M. Technical Session 8:00 P.M.

Movies: "Steel Manufacturing" and "In Alaska with Gun and Camera."
Speaker: R. A. Horner, Sales Manager, Barber-Colman Company Machine and Small Tool Division.
Subject: "Closer Limits —Through the Years."

PROFITS ON SHORT RUNS
with
MULT-AU-MATIC ECONOMY

Standard Tooling—Ease of tool change-over from job to job—flexibility—all combine to make the Bullard Mult-Au-Matic a machine easily adaptable to medium quantity or larger volume production without material sacrifice in effective operating Economy and Profitable Efficiency.

Many manufacturers have discovered the Profitable Mult-Au-Matic possibilities on short runs and are using these machines to their advantage.

Today's Economic Problems require increased manufacturing Efficiency. Investigate these machines and Let us answer the Question, "On Short Run Jobs do Mult-Au-Matics pay for themselves and make a Profit to boot?"

THE BULLARD COMPANY
BRIDGEPORT • CONNECTICUT

Two Way High Production Equipment Finishes Rear Axle Housings Ends Complete

THE equipment featured on the cover of this magazine consists of a standard two-way bed with heads and fixture designed and built by Snyder Tool & Engineering Company of Detroit. This machine performs the following operations on the rear axle housing:

1st Station — Load one part.

2nd Station — Rough bore two diameters and chamfer both ends.

3rd Station — Semi-finish two diameters, turn and chamfer O.D. of flange.

4th Station — Rough turn both sides of flange with a cross facing tool.

5th Station — Finish spotface, face of flange.

6th Station — Finish ream bearing diameter.

7th Station — Combination drill and ream five holes in flange.

Fixture is 7 Station Trunnion Type. Housing is equalized lengthwise by means of a cam expander in the banjo opening.

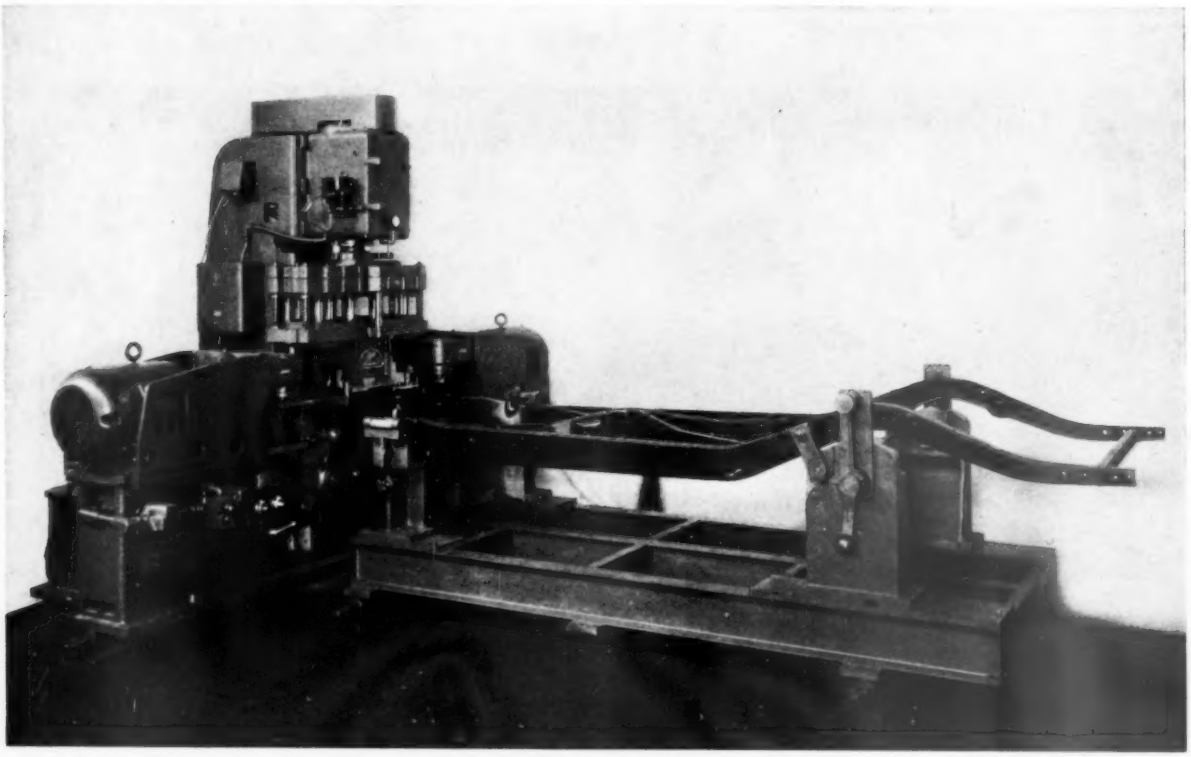
The picture at the left exemplifies the type of single purpose machine required where high production and economy of space are the primary factors. The operation is drilling and chamfering two cotter pin holes in spring clips. Parts are carried in separate fixtures on a Trunnion Automatically indexed through a Geneva Cam. Spindles have the conventional feed cycle with their movements synchronized with the Trunnion. All machine functions are mechanical including the Automatic Clamping and unclamping of parts. Production is 1200 Per Hr. @ 80% efficiency. Floor Space 37" x 44". Another Snyder Tool & Engineering Company Development.

Jaws grip the part back of the flange on each end; One Fixed and One Compensating. Tool holders are guided in bushings in each end of the trunnion housing. Three guide bars on each end align the trunnion and sliding heads.

The machine ways are hardened and ground and the saddle has bronze wear plates.

This machine produces 40 pieces per hour at 85% efficiency.

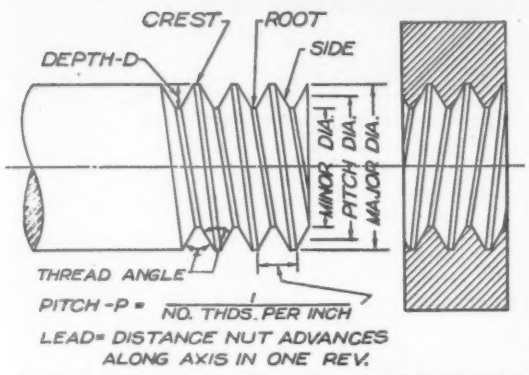
The machine shown below is a good example of combination milling and drilling. It mills four motor support pads on the front end of an automobile frame. Milling is performed by means of a Special two Spindle Milling head on each end of a horizontal base. On completion of the milling operation, the vertical 12 spindle drill head drills 8 holes in motor support pads and four holes in front cross member. Machine is fully hydraulic with the cycle controlled by one push button and equipped with necessary safety features to prevent interference of moving parts. This equipment also manufactured by Snyder Tool & Engineering Company.



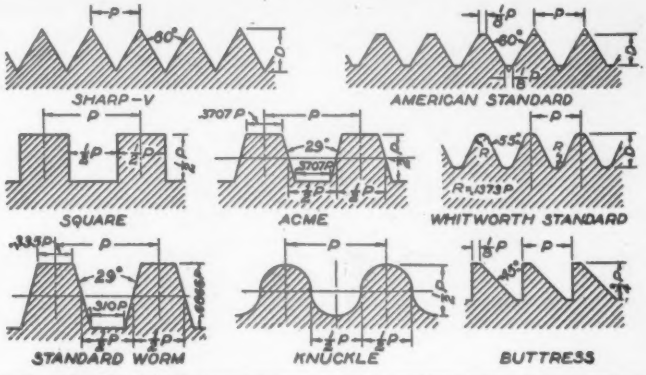
Courtesy of MECHANICAL DRAWING ASSOCIATION OF N. E., E. H. Temple, Chairman of Standards Committee.

SCREW THREADS

NOMENCLATURE

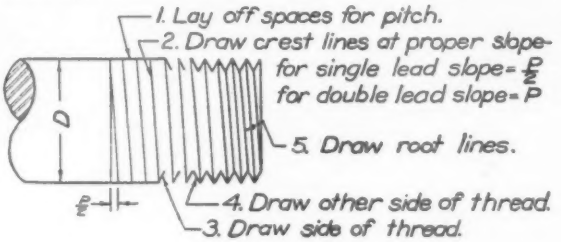


THREAD FORMS

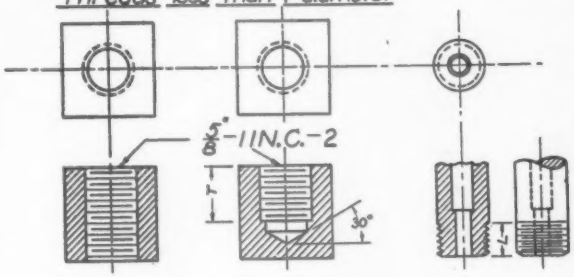


THREAD REPRESENTATION

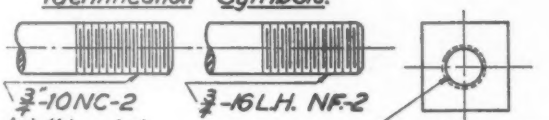
Steps in drawing V and American (National) Threads, when diameter is one inch or over:


1. Lay off spaces for pitch.
2. Draw crest lines at proper slope- for single lead slope = P/2 for double lead slope = P
5. Draw root lines.
4. Draw other side of thread.
3. Draw side of thread.
D

Threads less than 1" diameter



Identification Symbols.

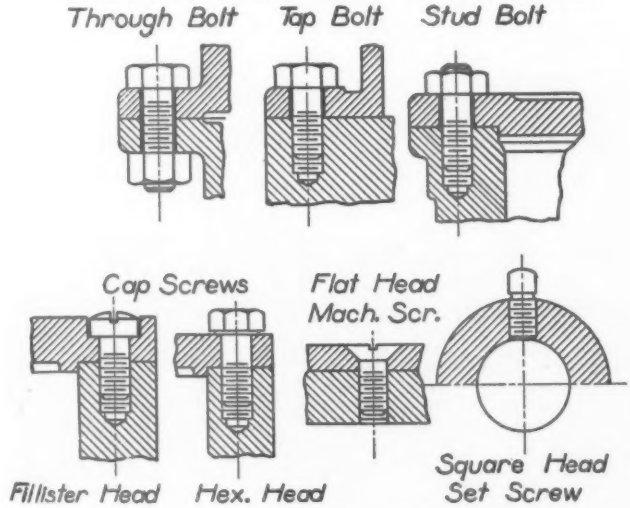


(a) Major diameter in inches.
(b) Threads per inch. L.H.-Left Hand
NC-National Coarse (U.S.S.)
NF-National Fine (S.A.E.)-E.F.-Extra Fine
(c) Class of Fit between bolt and nut.

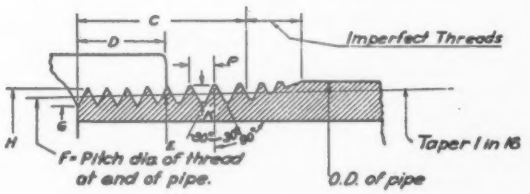
Screw-thread Fits. (Consult A.S.A. B1.1)

Class 1 Fit.- Used for rapid assembly, where shake or play is not objectionable.
Class 2 Fit.- Recommended for the great bulk of interchangeable screw thread work.
Class 3 Fit.- High quality work, recommended only in cases where high cost of production is warranted.
Class 4 Fit.- Intended for unusual requirements more exacting than Class 3. It is not, as yet, produced commercially.

APPLICATION OF BOLTS AND SCREWS



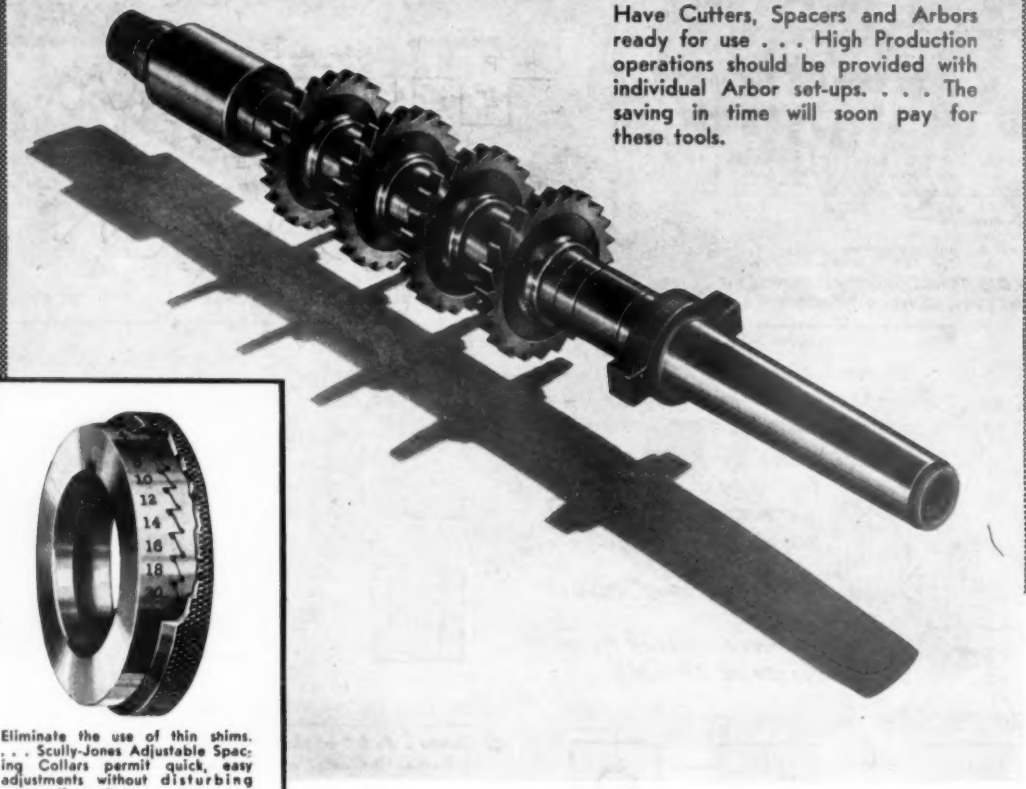
PIPE THREAD



C = Length of Effective Thread.
D = Normal Engagement by Hand.
E = Pitch Diameter at Gaging Notch.
G = Root Dia. at small end of Thread.
H = Outside Dia. at small end of Thread.
K = Depth of Thread.

The pipe thread has been standardized by the A.S.A. It is similar to the American National thread in form, but is cut on a conical surface. The crest and root are truncated an amount equal to 0.033 P.

TEAR OUT THIS SHEET, PUNCH FOR BINDER OR FILE FOR REFERENCE



Have Cutters, Spacers and Arbors ready for use . . . High Production operations should be provided with individual Arbor set-ups. . . . The saving in time will soon pay for these tools.

Eliminate the use of thin shims. . . . Scully-Jones Adjustable Spacing Collars permit quick, easy adjustments without disturbing your entire set-ups.

MILLING REQUIREMENTS

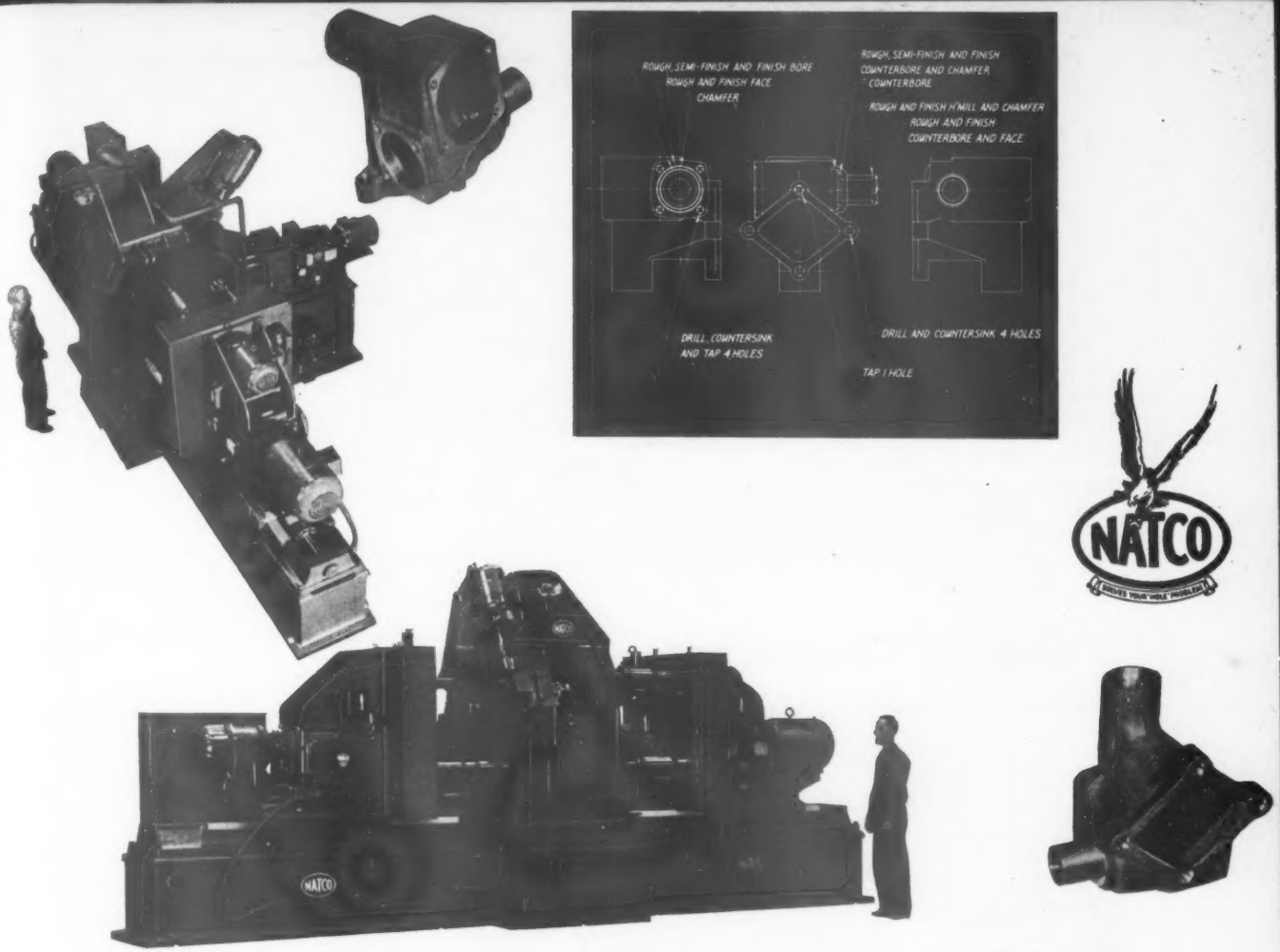
Arbors-Cutters-Collars

★

SCULLY-JONES & COMPANY

1903 SOUTH ROCKWELL
CHICAGO, ILLINOIS

MANUFACTURERS OF QUALITY PRODUCTION TOOLS



40 Operations are performed on 55 Steering Gear Cases per hour...

• The machine shown above is a NATCO four-way combination driller and tapper which is being used by a prominent automobile manufacturer for performing a total of 40 drilling, countersinking, tapping, rough and finish counterboring, rough and finish hollow milling, rough and finish boring and facing, and chamfering operations on 55 steering gear cases per hour. See sketch above for details of operations.

• This machine is built of three NATCO HOLEUNITS, one NATCO reversing motor drive Tapping Unit, and a seven-position automatic mechanical indexing trunnion type fixture arranged to hold one steering gear case in each position. As the parts index from station to station the various operations are performed.

• This NATCO four-way was built for a particular set of operations and may be considered special way-type equipment . . . . yet it is built of standard NATCO HOLEUNITS and other standardized machine elements which are flexible and interchangeable. They are built in a variety of sizes and capacities. Investigate them. Call a NATCO representative today.

Chicago Office, 2009 Engineering Bldg.
Detroit Office, 409 New Center Bldg.

The National Automatic Tool Co.
Richmond, Indiana, U. S. A.

Reduce Production Costs! Investigate NATCO Methods Today

NATCO

Drilling, Boring and Tapping Machines

Chapter Doings

(Continued from Page 20)

Three hundred members found interesting and instructive a forty-five minute talkie depicting both visually and verbally, the transformation of a heat of steel into a billet, and the processes of being made into a roll of glistening sheet steel 96" wide. After the film, we separated into groups of six each and were conducted through the mill by competent guides who could answer our every question.

A billet of glowing steel was repeatedly thrown against rollers which unmercifully squeezed and rolled it into a long slab. Massive shears cut off its jagged ends with gleeful grunts. Other rollers in successive order and with increasing speed flattened the slab into a longer and longer ribbon until with incredible speed its nose disappeared into the bowels of machinery. Hissing and squirming and doubling up on itself, its tail — with a final flip — also was swallowed up, the whole event bathed in clouds of steaming vapor. Then majestically and miraculously emerging from this seeming hell came a newly born roll of sheet steel, its free and feeble end resisting the efforts of puny man to tie it down.

WHEW!

Everyone voted this meeting a huge sucess.

HARTFORD

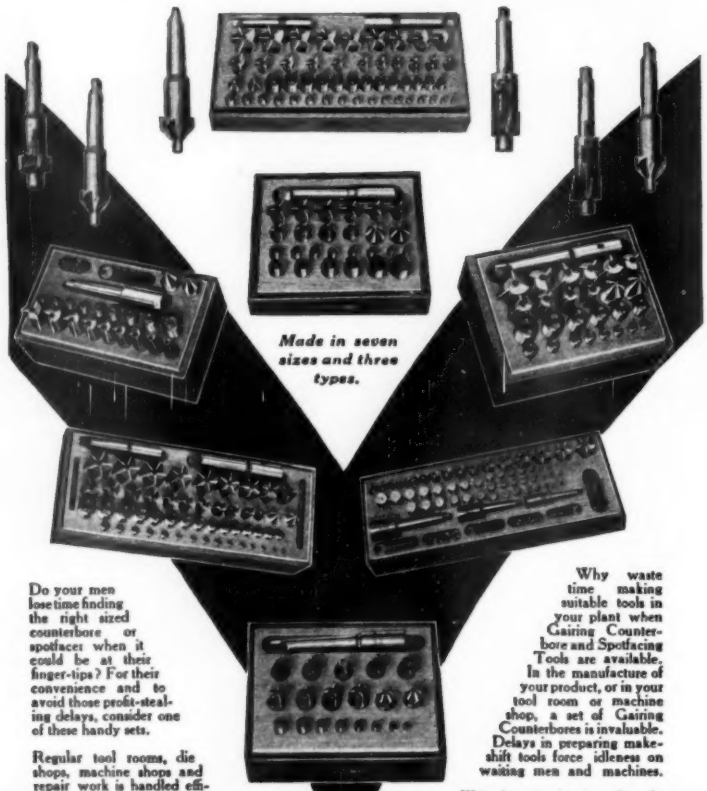
Frederic L. Woodcock, Secretary
56 Imlay Street, Hartford, Conn.

On Monday evening, October 25, the second meeting of the season was held at the Hartford Gas Co. Auditorium at 8:00 P.M. Chairman d'Arcambal welcomed members and guests and introduced Raymond J. Dunn who acted as technical chairman. Mr. Dunn introduced Alfred R. Hunter, Engineer of the Hartford Empire Co. who spoke on "Manufacture of Glass Bottles." Mr. Hunter has been with the Hartford Empire since its inception and has had much experience both in this country and abroad with glass making machinery and methods. His talk was splendidly given and enlightening, bringing out numerous interesting points and many startling disclosures about a class of manufacturing which has developed into one of the exact sciences. He had a large display of bottle molds and other interesting equipment which attracted no little interest and discussin. Mr. Dunn conducted the question period after the talk. Dinner at the City Club preceded the technical session.

Each meeting has been more largely attended than the one previous. Last season the Hartford Chapter averaged 116 attendance while for September we had 166 and at this meeting 175, so we are well started for a high score this year. An interesting feature of attendance is the broad territory covered. At all recent gatherings men were present from Springfield, Worcester, Waterbury, Bristol, New London, Meriden, Manchester, and New Britain, indicative of wide interest and high standard of quality of programs.

Hartford Chapter opened its fall meeting September 27, too late to be reported in the October issue of "Tool Engineer." The season got off to a good start, 166 attending the technical session and 38 the dinner which preceded it.

Gairing Counterbore Sets



Made in seven sizes and three types.

Do your men lose time finding the right sized counterbore or spotfacer when it could be at their finger-tips? For their convenience and to avoid those profit-stealing delays, consider one of these handy sets.

Regular tool rooms, die shops, machine shops and repair work is handled efficiently and expensive delays due to lack of proper cutting tools are greatly reduced.

Why waste time making suitable tools in your plant when Gairing Counterbore and Spotfacing Tools are available. In the manufacture of your product, or in your tool room or machine shop, a set of Gairing Counterbores is invaluable. Delays in preparing makeshift tools force idleness on waiting men and machines.

Write for a catalog describing the complete line of Gairing End Cutting Tools. Use Coupon No. 62.

THE GAIRING TOOL CO.
1629-35 WEST LAFAYETTE · DETROIT, MICHIGAN

ROCKFORD

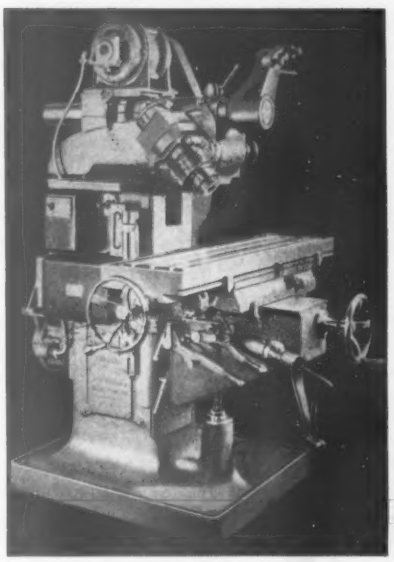
Herbert O. Olsen, Chapter Secretary
1016 Seventh Street, Rockford, Ill.

The first meeting of the newly organized Rockford Chapter No. 12 called to order at 8 o'clock October 15, 1937 in the South Ballroom of Hotel Faust by Chairman E. W. Dickett, Proposal Engineer of the Sundstrand Machine Tool Co.

The letter of October 6th by Frank A. Shuler, president of the A.S.T.E., and his report; the list of the board of directors for the years 1937-38; and the report by the National Secretary, Mr. C. Ray Brunner, were read

(Continued on Page 38)

EXTRA set-ups take time and cost money. Save both with a Van Norman Universal Miller. The cutter head can be easily and accurately set at any angle from vertical to horizontal; the ram on which the main cutter head is mounted can be moved in or out over the column quickly and easily. No time wasted in repeated set-ups. No chance for inaccuracies to creep in. Flexibility, ease of adjustment and ability to handle a wide range of work have made Van Norman Millers preferred to all others for toolroom, pattern shop and experimental work. Write for bulletins.



VAN NORMAN
MACHINE TOOL CO.
SPRINGFIELD, MASSACHUSETTS

HANDY ANDY'S ..WORKSHOP..

You know, this editing racket (to use a colloquialism) has its compensations to offset the work that the job entails. One goes over the stuff as it comes in, not casually — critically, rather — but as a sort of routine procedure that must be handled impartially and thoroughly. Then, bang! — an item brings up memories, or a name becomes a personality. One meets an old friend, bobbing up as from nowhere, and the game suddenly has an added zest.

▼ ▼ ▼

Going over the matter for this issue I came across a couple of photographs of spinning wheel details, and immediately a curtain was raised, revealing not a scene from the past but a pageant. And such a colorful pageant, so real, so intimate that I am stirred to portray it. For, among our thousands of readers there are hundreds who have seen the things I am going to tell about, have lived them even as I. No, I am not going to tell you where it all happened, I am only going to describe it. And when you have read it, there will be many who will exclaim: "Why, that's my home! I know the scenes, I lived there, spent my childhood there."

▼ ▼ ▼

Now, obviously, the spinning wheel that stands so proudly — and so reminiscently — by the fireplace in the living room once had a more utilitarian place in the home. Yes, and in the nation — and throughout the world—for its cheery hum sang the song of empires in the making. It helped create civilization, spun the yarns for the sails that sped adventurers across uncharted seas, it spun the raiment of aristocrats and kings, the homelier stuff of the lowly. It was the forerunner of the vast textile industry. Oh, it has traditions, has the spinning wheel, traditions of courage, fortitude, character. Yes, and of progress.

▼ ▼ ▼

Before the wheel could spin its thread, however, there had to be stuff to spin, and all that came from the soil, even as it comes today. So, we are going to take a typical setting, mellow it, perhaps, with the mark and wear of time, hallow it with the love one feels for the home of one's boyhood. A farmstead stands in a clearing, the sun glinting on tiled roofs, softening on the thatch of outbuildings, playing colorfully across greening birches and somber pines, shimmering over the vast expanse of a lake that bounded one side of the place. It is spring, and the fields are green with the tentative promise of harvest.

▼ ▼ ▼

One field lies fallow, and there a lone sower wends his way, his back a little bent, his step somewhat halting, and the years have etched their mark on his features. But his face is serene, the hands, one steadying the container slung over his neck, the other casting the seed, show purpose and character. Do you recall him, perhaps? Or is he merely the sower, one of a legion? But our sower is sowing flax, and his hand caresses the tiny grains as they slide through his fingers, then glint momentarily in the sun and fall to earth. Then his sowing is done, he plods tiredly to the house in the distance, glances speculatively at a flock of sheep in a far pasture. Tomorrow they must be sheared.

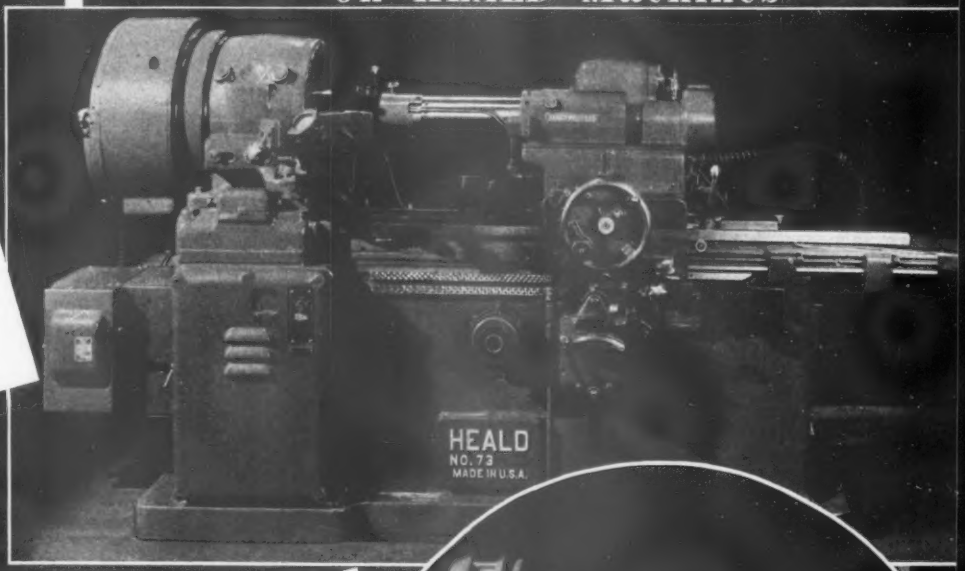
▼ ▼ ▼

It is summer, and the awned

(Continued on page 34)

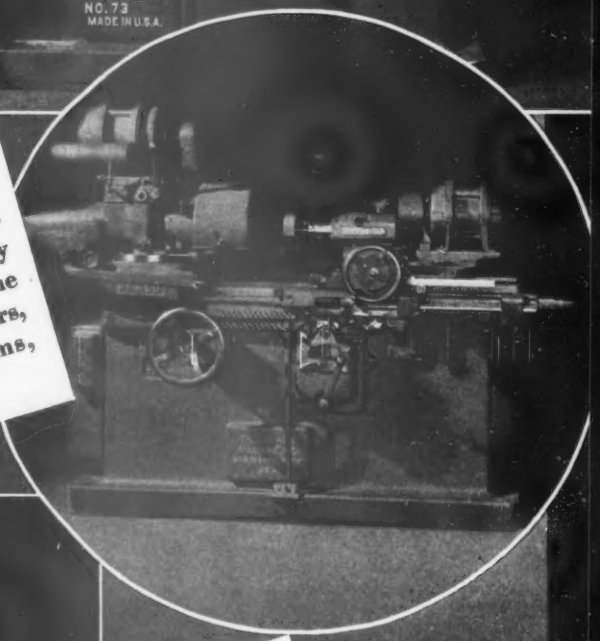
HIGH in
cutting quality
stability
anti-rust value
Stuart's
"KLEEN-KUT"
TRADE MARK REGISTERED
SOLUBLE CUTTING OIL
Phone or write today for Free Working Sample of this low priced modern soluble oil.
D. A. STUART OIL CO. Ltd.
CHICAGO, U. S. A. - - EST. 1865
Warehouses in Principal Industrial Centers

The Bores in the Vital Parts of Nearly All *Airplane Engines* Are Precision Finishe On HEALD Machines

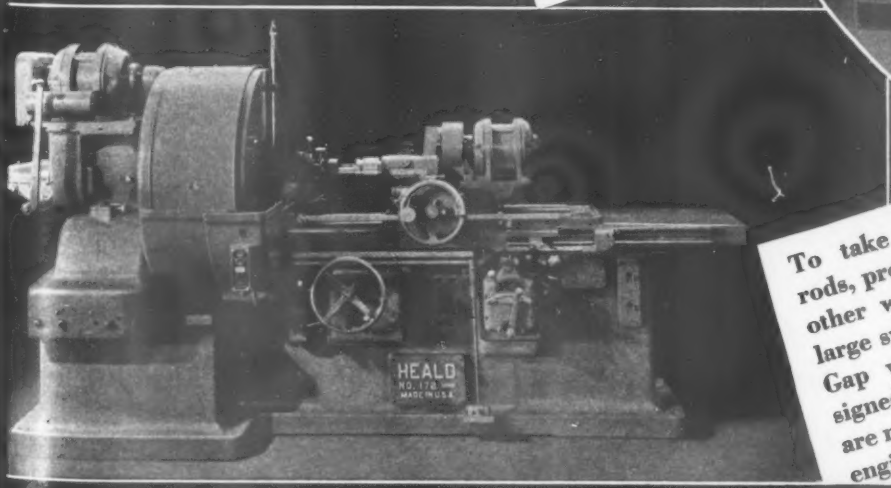


Heald No. 73 Airplane Engine Cylinder Grinders are being used by various airplane manufacturers the world over for obtaining perfect cylinder bores.

These machines are unquestioned equipment in all of the large airplane motor manufacturing plants.



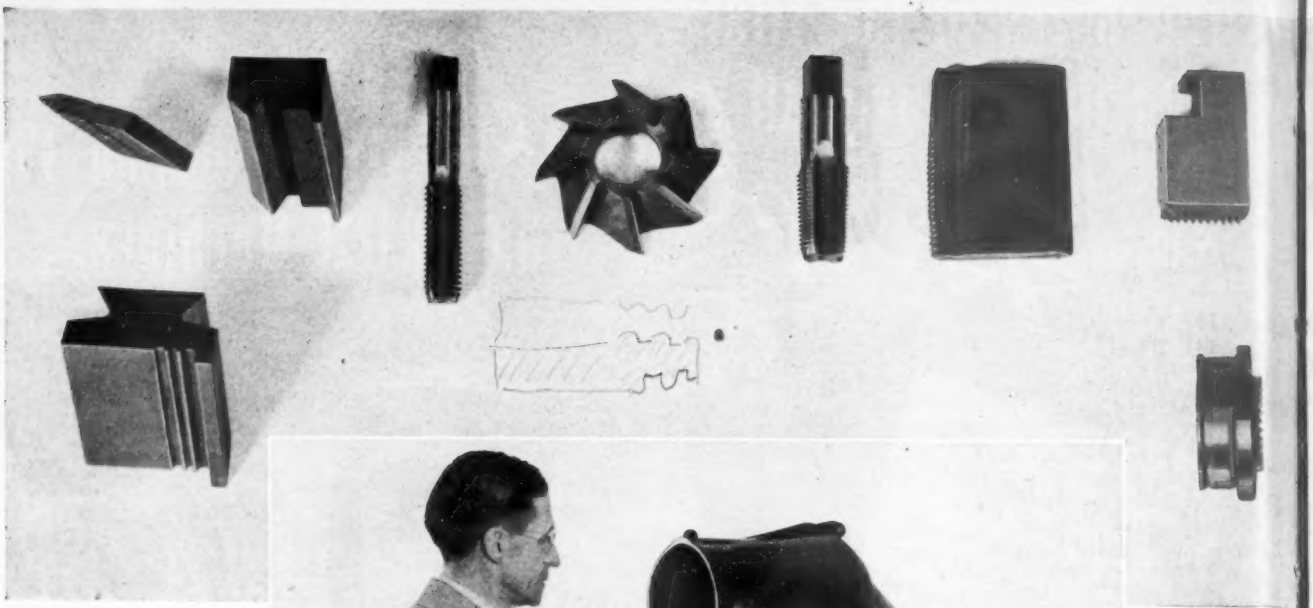
The No. 72 Plain Internal is a general all around machine giving that ultra-fine finish and accuracy demanded by airplane manufacturers in gears, bushings, rolls, cams, and similar work.

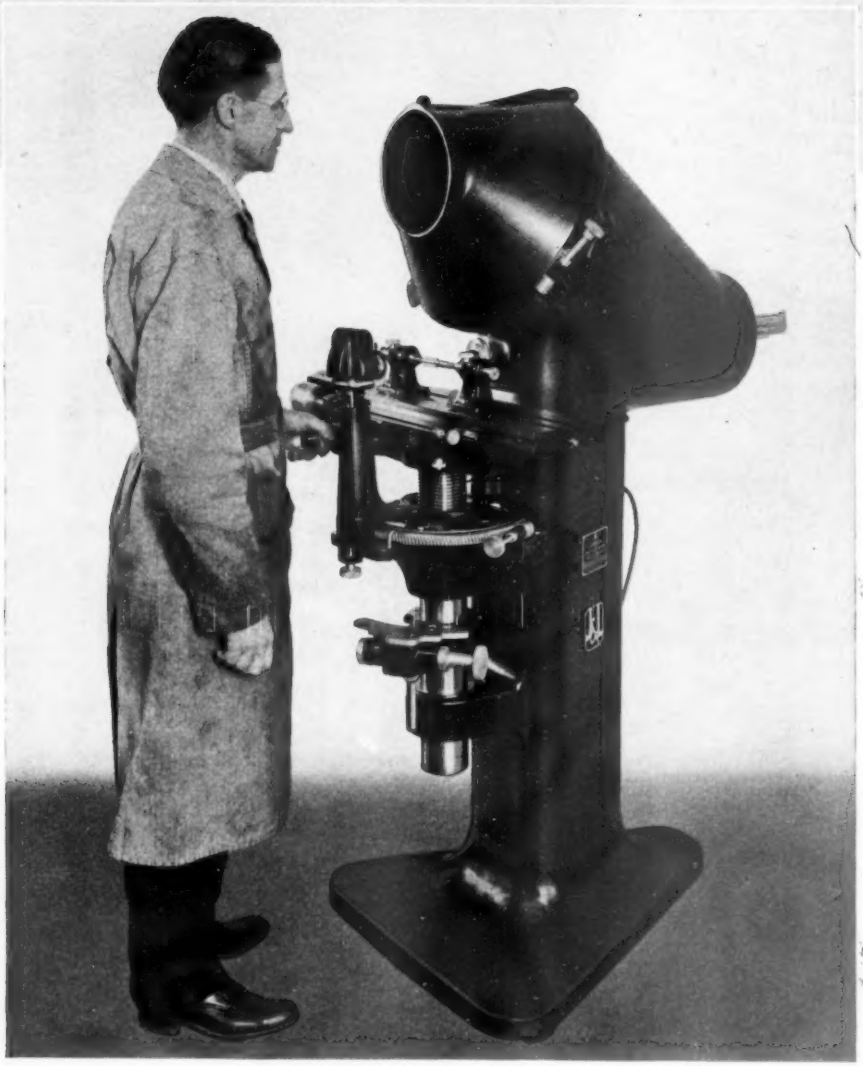


To take care of long rods, propeller hubs and other work requiring a large swing, the No. 172 Gap was especially designed and built. Many are now used on airplane engine work.

An installation bulletin of airplane work handled on these machines gladly sent on request.

The *Heald* Machine Co., Worcester, Mass., U. S. A

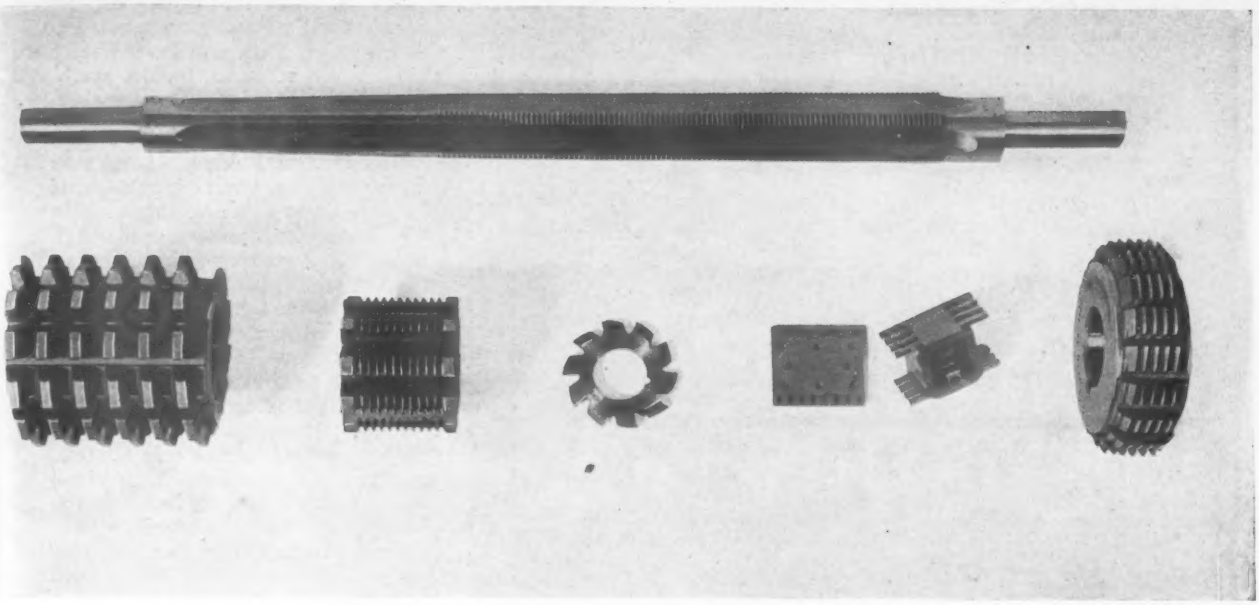




J&L 7" PEDESTAL COMPARATOR

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT



THE TOOLS IN YOUR SHOP SHOULD HAVE THE ADVANTAGE OF COMPLETE INSPECTION

The J&L Pedestal Comparator Offers Just That!

With the J&L Pedestal Comparator and Measuring Machine you have all the equipment necessary to keep a constant and complete check on most shop tools.

These tools include straight and taper taps, hobs, form tools, gear cutters, milling cutters, chasers, dies and punches, as well as all kinds of gages.

The Pedestal Comparator may be used to compare objects with a master outline, or it may be used for the direct measurement of lead or spacing, height or depth, and angles. The enlarged shadow may be photographed for a permanent record.

Without experience or special training any shop man, with very little instruction, can operate the machine with speed and precision.

Leading tool and gage manufacturers, as well as automotive, machinery, electrical, instrument, glass, closure and steel manufacturers have accepted the J&L Pedestal Comparator as the most universal inspection machine offered to the trade today. This statement is made with complete assurance—repeat orders are evidence of their complete satisfaction.

Whatever your inspection problems may be, send them to our Engineering Department. It is always at your service.

Handy Andy's Workshop

(Continued from Page 30)

grains nod their heads in the fields. Coming through the lane from the highway, one hears the rustle of the birches, the sough of the pines, sees the vast blue expanse of the lake, restlessly rolling. But it is not as blue as the field where the flax is in flower, nor any more restless than the billows that roll down the field, sending the shedding flowers like a spray ahead.

▼ ▼ ▼

It is fall, the fields are shorn. The reapers have been there, the straw is stacked, the grain in the granary waiting to be carted to the grist mill. In front of the barn a circular track where oxen, yoked to a boom, give power to the thresher that outrages the quiet of the setting. But in the somber twilight among the pines there is activity, for there the sower and his household are busy at a rectangular kiln, consisting of a pit in the ground walled with stone to a height of three feet or so. On slats laid crosswise the flax is drying after removal from the retting vats. Then into a chopper, an oaken blade manually operated. Up and down it goes, and the stems of the flax are softened, fluffed, ready for the wheel.

▼ ▼ ▼

It is winter, and the lake is at rest, ice locked, the fields are blanketed in snow and a kindly moon floods the landscape in a soft light. Inside the house the fireplace radiates a gentle heat, augments the flicker of candles. By the fire the sower mends his gear, while a boy pores over his primer. But away from the fire the women sit, one at her knitting (she is old) and another at the spinning wheel. It's flax now; the wool has long since been spun, is now being transmuted into socks and mittens, mufflers and sweaters. The wheel hums, and a thread, as flaxen as the head of the spinner, winds slowly around the bobbin. The candles, steeped by their own hands, light spinner and knitter at their work.

▼ ▼ ▼

The seasons effect their cycle, winter merges into spring; where the spinning wheel hummed a hand loom now stands. Tramp!—whirr!—swish!—the shuttle goes to and fro, directed by deft fingers. On the takeup, a roll of linen grows and grows, is removed to lie with the bolts of woolen in the storeroom. Some of the latter will go to the tailor, some of the linen will be made into table cloths and sheets, to the uses of the home; some of both will go to the market, to be bartered or sold. It is stuff that will wear, and last. It is honestly made, no shoddy, no imitation.

▼ ▼ ▼

Some of it, no doubt, shrouded the sower and his wife, for the hands of both are long since stilled; only the boy remains. Do you remember that boy? For all this happened but a generation ago, and the boy is a man, betimes running his hand over the spinning wheel that stands by the fireplace, recalling—yesterday. For so swift has been the progress of this age that many of us have been transported from scenes as I have described to the ultramodern things of today; we have even helped to create these modern miracles. We have kept pace with the march of progress, may have even led the parade at times. ▼ ▼ ▼

A strange theme—and sentimental—you may say, for a technical publication dedicated to mechanical progress. But no! For the boy who learned the rudiments of handicraft from the ground up, who had to

(Continued on Page 36)

PRECISION PAYS

THERE'S ONLY ONE YOU CAN SELL ME—
THE PRECISION SET

DANLY DIE SETS AND DIE MAKERS' SUPPLIES
From the 8 Danly Branch Office Stocks

BRANCHES:

LONG ISLAND CITY, N. Y.
36-12 34th STREET
DETROIT, MICHIGAN
1549 TEMPLE AVENUE
CLEVELAND, OHIO
1745 ROCKWELL AVENUE
DAYTON, OHIO
990 E. MONUMENT AVENUE
PHILADELPHIA, PA.
3913 N. BROAD STREET
ROCHESTER, N. Y.
16 COMMERCIAL STREET
MILWAUKEE, WIS.
513 EAST BUFFALO STREET

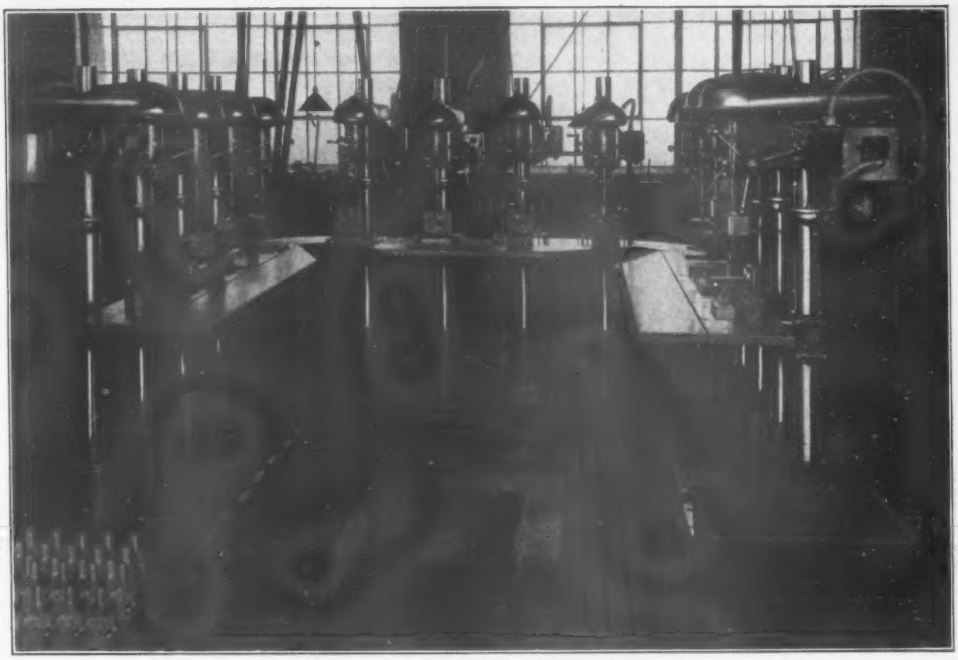
● Those firms that use stampings to the point that they are major items in cost, long ago learned the value of the Danly Precision Die Set.

They know that precision pays, in the freedom from shearing, less regrinding and, above all, insurance against die destruction and production line tie-ups.

Precision Pays—make sure you get it by specifying Danly Precision Sets for mounting all your dies.

DANLY MACHINE SPECIALTIES, Inc., 2114 So. 52nd Avenue, Chicago, Ill.

DANLY DIE MAKERS' SUPPLIES



A battery of twelve 17" Delta Drills saving money for a Detroit auto-accessory manufacturer.

4 BIG REASONS

for using DELTA Drill Presses

BECAUSE Delta drills are built to precision standards in a modern production plant, they cost you less than any comparable drills you can buy. Because they are equipped with self-sealed ball bearings throughout, they require no lubrication at any time—and practically no other maintenance. Because they are thoroughly engineered and tested under production, they will "stand up and take it" alongside drills costing several times more. Because of their low cost, low maintenance and low power consumption, they can be used in dozens of places in your plant where heavy, expensive machines would be out of the question. . . . Let us tell you the complete story of Delta Drill Presses, 11", 14" and 17" models. Write—NOW—for complete information and name of nearest dealer. It will pay you dividends.

1

They are low in first cost.

2

They are extremely economical to maintain and operate.

3

They are highly adaptable, and engineered for long life.

4

They will continue to save you money throughout their entire life.

DELTA MFG. CO.

624 East Vienna Ave., Milwaukee, Wis.

Specialized Applications

(Continued from Page 13)

permitted to move rearward sufficiently to allow the chasers to open and clear the work. The movement of the operating sleeve as mentioned above in this installation was controlled by a separate mechanism provided on the machine so that the cutting and opening positions of the chasers are under positive control during the entire cutting action.

Although standard size chasers were used in this die head they had to be designed special in some respects. The taper of the threads had to be so arranged that the small end diameter of the chasers was at the forward end, which is the reverse of ordinary taper threading.

Fig. 5. This die head was designed especially for cutting short taper pipe nipples. The chasers start cutting at the forward end of the work and gradually open as they feed on. When the center of the nipple or the large diameter has been cut the chasers gradually close producing the taper thread on the rear end. The thread cut in this manner is continuous from end to end. The Die Head cam for controlling the movement of the Chasers is provided with a projecting closing pin which follows along a former plate held in a stationary position on the machine. An outline of the former plate is shown on the drawing. This

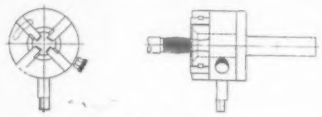


Figure 5.

plate must be backed out of position at the completion of the thread so that the die head can be returned to its starting point. Feeding of the die head during the cutting of the thread is controlled by a lead screw on the machine. The chasers for this installation were formed with a double taper converging for cutting the thread on the forward end of the work, and diverging for the thread on the rear end.

Fig. 6. This is a solid adjustable tap designed particularly for tapping two threads of the same pitch but of different diameters simultaneously. It must, of course, be reversed at the completion of the cutting of the thread. The forward or smaller tap has a flanged body which acts as a cap for retaining the chasers of the larger one. Screws and dowels are used to hold the two together securely. Adjusting screws

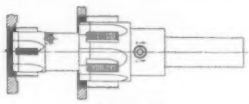


Figure 6.

are provided in each die head for accurately setting the chasers for diameter. Standard chasers are used in these tools.

Many readers probably know of installations more novel and interesting than those described above. Undoubtedly there are numerous standard die heads and taps purchased which are modified or applied to machines in some special manner by the customer.

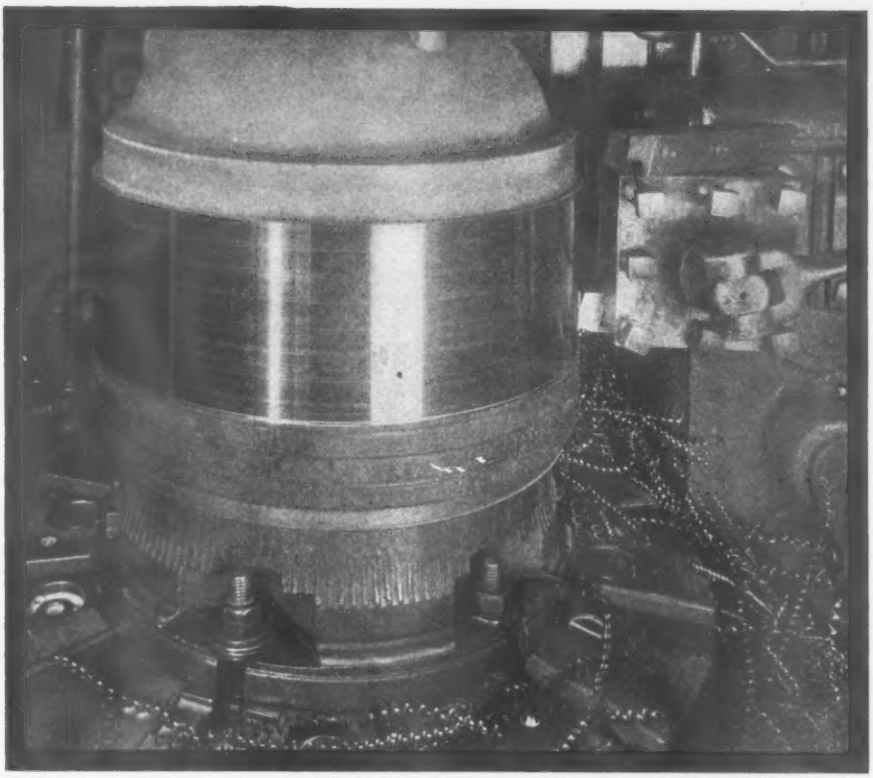
Handy Andy's Workshop

(Continued from Page 34)

make his own toys, who helped make household appliances of an earlier day, must somehow be a better Tool Engineer for that background. He was trained in analytical thinking, and I wager that, were a census to be taken of leaders in engineering, many would say that a boyhood on the farm grounded them in their career. So, here's to the old spinning wheel—may it long grace the fireside.

H. A.

LESS BREAKAGE
WITH
WELDON
DOUBLE END
END MILL
Every Tool made under Controlled Heat Treatment
LESS BREAKAGE
Because—
1. Weldon uses high speed steel up to its own high specified standards, steel carefully checked chemically and microscopically.
2. Weldon endmills have a cupped end and rugged formed teeth, designed for strength and free cutting.
3. Heat treated by technically trained men, aided by the most modern time and temperature controlled hardening equipment.
Let the Tool Itself Prove It!
Pioneers in Fast Spiral Double-end End Mills
The WELDON TOOL CO.
321 FRANKFORT AVE.
CLEVELAND, OHIO
"Look for the name WELDON on the tool"



Finish turning O.D. of ring gears, .670" thick, eleven rings on fixture per load. Material: S.A.E. 1045, Brinell 170-187. Tool used: V-R, Grade E, Style 11, 1¼" x 1¼" with 28° chip breaker. Performance of V-R tool:

Tool Used	Speed	Feed	Depth of Cut	Cutting Time, Load	Production per Grind
V-R Grade E	305 S.F.M.	.027"	⅛"	3.50 Min.	20 Loads—220 Pieces

NOTE: Previous practice required two tools in tandem, each cutting half the load (5 rings each) and 10.50 min. cutting time—a 10% increase in capacity and a 66⅔% reduction in cutting time with V-R Grade E.

More and more, modern industry is discovering in Vascoloy-Ramet, the tantalum carbide tool material, the answer to its demands for the maximum in feeds, speeds and tool life.

Increased production, faster time from floor to floor and lowered machining costs are the almost invariable result when V-R tools are put on the job.

Produced in 17 standard grades, of different tantalum carbide content, strength and hardness, V-R alone covers the entire range of machinable materials with "a grade for every use."

It is unrivaled in the machining of all steels, from the softest to the hardest alloys, which it turns without "cratering." In addition, its performance on cast iron, cast iron alloys, semi-steels, non-ferrous metals and materials is exceptional.

"A grade for every use" may be the answer to the machining problems in your plant. Write for the new V-R catalog price-list.

VANADIUM-ALLOYS STEEL CO.
VASCOLOY-RAMET DIVISION, NORTH CHICAGO, ILL.

VASCOLOY-RAMET BLANKS

Vascoloy-Ramet is available in three forms, (a) completely finished tools, (b) milled and brazed tools, and (c) blanks. V-R blanks are furnished in 5 standard styles and in sizes to meet every requirement. To make tools with V-R blanks is a simple operation, fully described in a new instruction booklet, available free—upon request.

VASCOLOY-RAMET

. . . The TANTALUM CARBIDE TOOL MATERIAL . . .

A GRADE FOR EVERY USE

District Sales Offices:

Pittsburgh . . . . . Pa.
Latrobe . . . . . Pa.
New York . . . . . N. Y.
Springfield . . . . . Mass.
Boston . . . . . Mass.
Providence . . . . . R. I.
Cincinnati . . . . . Ohio
Cleveland . . . . . Ohio
Detroit . . . . . Mich.
Chicago . . . . . Ill.
St. Louis . . . . . Mo.
Buffalo . . . . . N. Y.
Philadelphia . . . . . Pa.
Newark . . . . . N. J.
Knoxville . . . . . Tenn.
Los Angeles . . . . . Calif.
San Francisco . . . . Calif.

Chapter Doings

(Continued from Page 28)

to the chapter body by the secretary, Mr. H. O. Olson, who also gave a brief resume of the organization meeting held on September 10th, 1937.

George Johnson, 1st Vice-Chairman, informed the members that a questionnaire would be prepared to be circulated by the membership committee members to ascertain the wants of the members on many questions: meeting places, kind of meals, the evenings for the meetings, etc., as well as matters of local policy. Answers to this questionnaire would serve as a guide to the officers, and the various committees to make arrangements satisfactory to the majority.

H. J. Caldwell, treasurer, announced the procedure that the A.S.T.E. headquarters had suggested for the obtaining of the data sheet binders, namely by sending in the card for that purpose with an enclosure of $1.36 to cover cost and mailing. He also stated he would take orders for the A.S.T.E. pins for those who wanted them.

Chairman Dickett spoke as follows: "Chapter No. 12 of Rockford, Illinois, welcomes you to its first technical session. A program has been prepared, which we feel should meet with your approval, and interest. As the first speaker, we are fortunate to have Mr. R. R. Wedell of the Ingersoll Machine Company speak to us on the subject: "Tool Engineering in England." At the close of Mr. Wedell's paper a good round of applause gave evidence of its successful delivery.

Introducing the second speaker, Chairman Dickett said: "The gentleman who will now address you has come all the way from McKeesport, Penna., to tell you how a widely used cutting metal is made, in his paper entitled: 'The Making of Sintered Carbide Tools.' I now present to you: Mr. Malcolm F. Judkins, Chief Engineer of the Firth-Sterling Steel Co." A lively and profitable discussion followed, and continued with no signs of abating. Chairman Dickett announced that rather than stop the discussion before the members had obtained the desired details of information, he would appreciate it if the balance of the questions would be asked after adjournment, should it be satisfactory to Mr. Judkins. The speaker gladly consented. The technical session adjourned at 10:20 P.M.

Announcing!

A New Design in Piston Pumps for Hydraulic Pressure Equipment

OFFERING—

1. **Rugged Construction.**
2. **Compactness—Six Pistons mounted parallel around Drive Shaft. Weight, 23.5 pounds; capacity, 3.25 and 6.5 gal. per minute. Weight, 67.5 pounds; capacity, 11.8 to 36.24 gal. per minute.**
3. **Constant Power—Guaranteed to maintain pressure up to 1000 pounds.**
4. **Economy in Power Consumption—6.5 gallon pump requires a 2HP motor drive at 1000 pounds pressure.**
5. **Direct Motor Drive at 1140 R.P.M., with right or left hand rotation.**
6. **Greater Efficiency at working oil temperatures, due to positive piston displacement.**
7. **Longer Life—All moving parts self lubricating.**
8. **Uniform Flow, with or without pressure.**
9. **Volumetric Efficiency under varying pressure.**

This high pressure hydraulic pump is of the multi-piston type with positive uniform flow. The pistons are mounted in a circle parallel to the drive shaft, permitting a large area of piston displacement within a compact housing and securing the high volumetric efficiency and positive displacement of piston action.

Write for descriptive circular with engineering data.

HYDRAULIC DETROIT PUMP CORP.

533 Orleans Street, Detroit, Mich. **Cadillac 8455**

MILWAUKEE

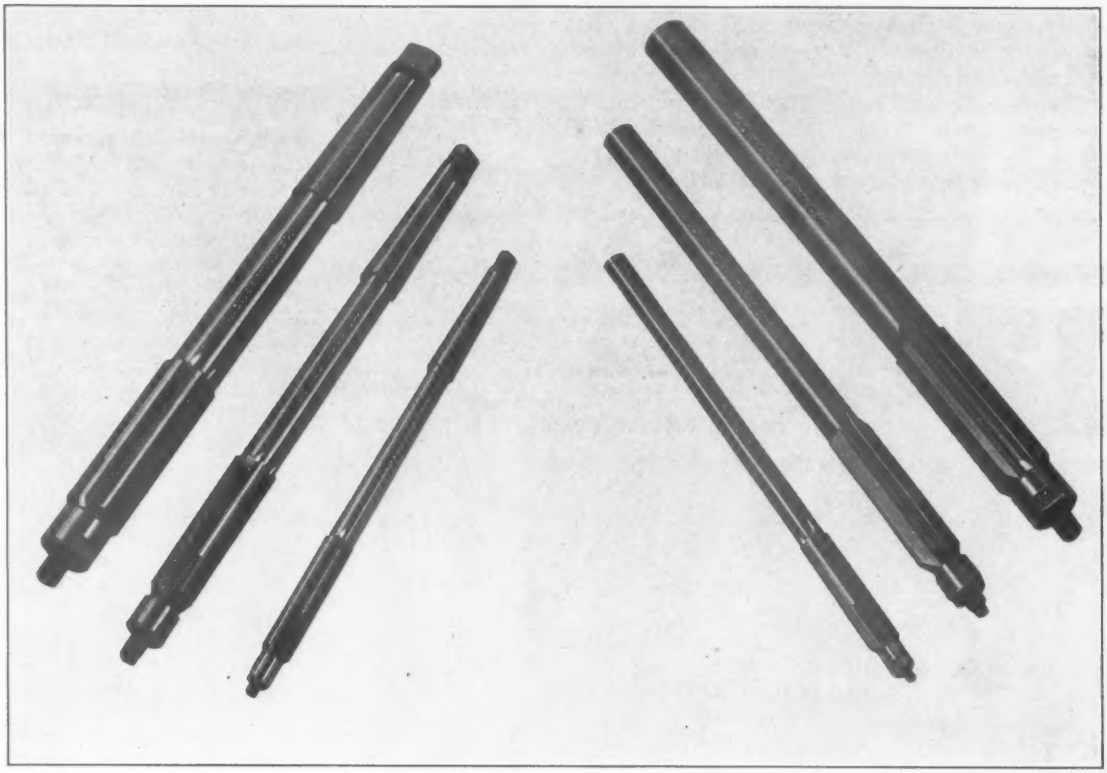
Emmor E. Houston, Chapter Publicity Chairman
1029 South 35th Street, Milwaukee, Wisconsin

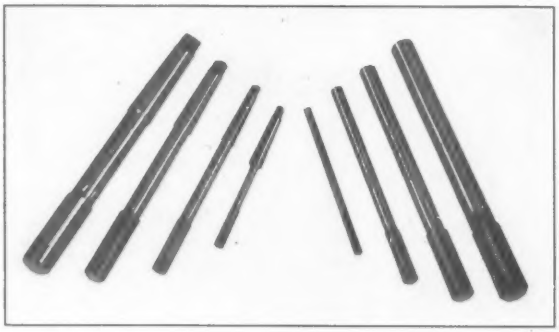
The Milwaukee Chapter has had some very unusual meetings in the past, but our October meeting was a real surprise party. After the usual careful planning by our officers and their committee, we were notified that the guest speakers of the evening, Mr. Harold Stein, Allis-Chalmers Research Engineer, and Professor Oaks of Wisconsin, would be unable to speak before our group. The Wadhams Oil Company, through the efforts of Chairman Smart, were asked to do honors in place of the originally scheduled speakers.

Mr. C. R. Smith of Wadhams, assisted by Mr. R. Schultz, presented the problem of lubrication in the machine tool industry. The talk was illustrated by one of the finest industrial talking films which our group has had the pleasure to see

(Continued on Page 40)

The First STANDARD Line





of CEMENTED-CARBIDE TIPPED REAMERS

A complete line of expansion and solid type Cemented-Carbide Tipped reamers offered in a standardized price range! This development of the Morse Tool Company presents entirely new possibilities for reducing your tool costs per piece to an absolute minimum.

As the new Morse Cemented-Carbide Tipped Reamers are carried in stock, you are assured of immediate delivery. The standardized price list gives you exact knowledge of the purchase cost of any reamer for any specific job. Proven performance promises exceptional service at unbelievably low cost. They are available NOW to meet the most exacting requirements of the toughest production schedules.

Your Price List Is Ready ..Write For It - TODAY!

A complete price list with detailed information on Morse Cemented-Carbide Tipped Reamers is now available. Your request will receive our immediate attention.

MORSE

TOOL COMPANY • 116 E. Goldengate Ave., Detroit

Chapter Doings

(Continued from Page 38)

and hear. Following Messrs. Smith and Schultz, a disciple of Houdini and Thurston showed the Tool Engineers how simple it is to do seemingly difficult feats of magic with very little effort.

Chairman Smart, Charles Riedel, Secretary, and Arthur Johnson, Treasurer, read the various reports from national headquarters, and Mr. Johnson's report was especially gratifying to the Milwaukee group since our Chapter is one of the few whose budget is balanced.

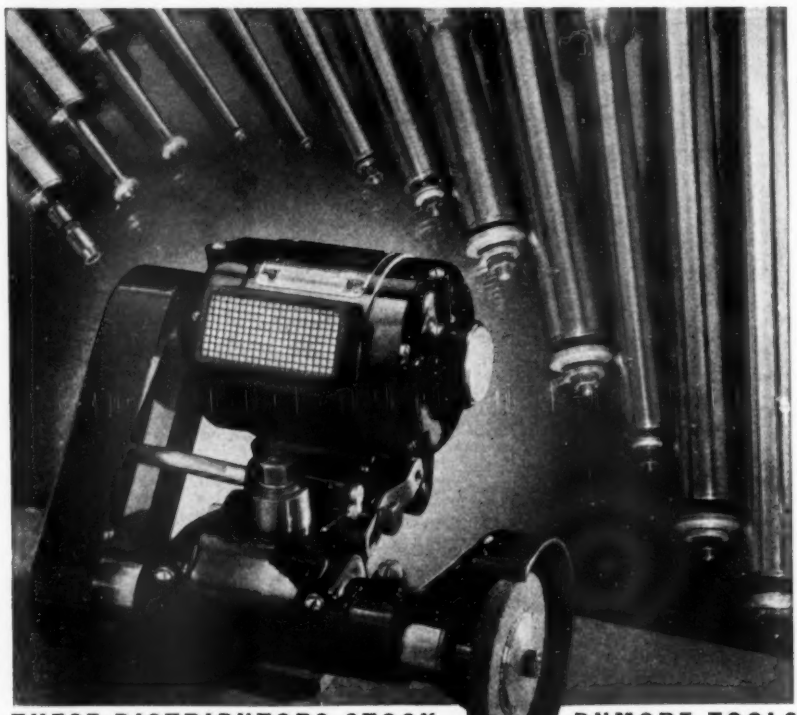
"Standing Room Only" signs greeted late comers to our October meeting, 160 members taking part in the evening's festivities. We had the pleasure to entertain several members of out of town Chapters, Messrs. W. R. Lund, Ingersoll Milling Machine Co., Rockford, Ill., Harry D. Freuhoff, Chicago. The following A.S.T.E.ers from Kenosha were also present: Messrs. H. E. Anderson, Lawrence Becker, R. Johnson, and John Holderied.

Five new members were accepted by the Milwaukee Chapter, Messrs. W. Polver, Clarence Engel, Gilbert Luedtke, Earnest Raddatz, and Fred Odell.

12 IN 1

A whole battery of grinders in one! If you have a Dumore No. 5 Grinder, these quick-change quills can lick a vast variety of tough grinding jobs . . internally, holes ½ to 18 inches deep . . . diameters down to ⅛ inch . . . external grinding, of course . . . speeds up to 42,500 . . . and all with accuracy to a tenth (.0001). Multiply your grinding range by adding some or all of this dozen extra quills. Let any of the distributors named below give you the full details and a FREE demonstration.

THE DUMORE CO., Dept. 227-L, RracINE, WIS.



THESE DISTRIBUTORS STOCK DUMORE TOOLS

AKRON — Hdws. & Supply Co.
ATLANTA—Fulton Supply Co.
BALTIMORE — H. A. Benson
BIRMINGHAM — Young & Van Supply Co.
Moore-Handley Hdws. Co.
BOSTON—Chandler & Farquhar
Chase, Parker & Co., Inc.
Cambridge Cutter, Wood & Sanborn Co.
BRIDGEPORT, CONN. — Hunter & Havens
BUFFALO—Seals, McCarthy & Rodgers, Inc.
CANTON—Canton Hdws. Co.
CHARLESTON, S. C.—Cameron & Barkley Company
CHATTANOOGA—Chattanooga Belting & Supply Co.
CHICAGO — H. Besly & Co.
S. E. Ellis Eng. Co.
E. L. Kesley Machy. Co.
Samuel Harris & Co.
CINCINNATI — K. A. Kinser Co.
CLEVELAND — Cleveland Tool & Supply Co.
W. M. Pattison Supply Co.
Strong, Carlisle & Hammond
COLUMBUS—Osborne & Sexton Machinery Co.
DALLAS—Briggs-Weaver Machy.
DAYTON—C. H. Geniger Machy.
W. H. Kiefaber Co.
DENVER—Hendrie & Bolthoff Mfg. & Supply Co.
DETROIT—Boyer-Campbell Co.
Chas. A. Strelinger Co.
ERIE, PA.—H. P. Weiler Sup. Co.
FT. WAYNE—Natl. Mill Sup. Co.
GRAND RAPIDS—Mfrs. Sup. Co.
HARTFORD—Hunter & Havens
Silliter-Holden, Inc.
HOLYOKE—J. Russel & Co.
HOUSTON—Wasemdorf, Neins & Co.
INDIANAPOLIS—Klieber-Dawson Sales Co., Inc.
Vonnegut Hardware Co.
JACKSON, MICH.—Smith-Winchester Co.
JERSEY CITY—Manning, Maxwell & Moore Co.
KANSAS CITY, MO. — Elfeldt Hdws. & Machy. Supply Co.
English Bros. Machy. Co.
KNOXVILLE — W. S. Murrian Co.
LANCASTER, PA.—Reilly Bros. & Rauh.
LOUISVILLE—Nelll-LaVielle Supply Co.
LOWELL, MASS.—Nobes Machy. & Supply Co.
LOS ANGELES—Ducommun Metals & Supply Co.
Eccles & Davies Machy. Co.
Machinest Tool & Supply Co.
M. N. Thackaberry
MILWAUKEE—W. A. Voell Machy. Co.
Western Iron Stores Co.
MINNEAPOLIS—Duncan & Co.
MOLINE, ILL.—J. J. Hermonyle Co.
MONTREAL—Canadian Fairbanks-Morse, Ltd.
Williams & Wilson, Ltd.
MUSKEGON, MICH. — Muskegon Hdw. Co.
NASHVILLE—Buford Bros., Inc.
NEWARK—Abrasive Machine & Supply Co.
NEW HAVEN — C. S. Mersick
Page, Steele & Flagg
NEW ORLEANS—Oliver H. VanHorn Co., Inc.
NEW YORK—Morris Abrams Guarantee Specialty Co.
Hansen & Yorke Co., Inc.
ORLANDO, FLA. — Harry P. Leu, Inc.
PEORIA—Keech & Hoyle, Inc.
PHILADELPHIA — Maddock & Co.
W. B. Rapp, Machinery
PITTSBURGH — Standard-Machinists Sup. Co.
PORTLAND, ORE.—J. E. Hasselino & Co.
PROVIDENCE — Belcher & Loomis Hardware Co.
Brownell Machinery Co.
Riverside Machinery
READING, PA. — Reading Machine & Tool Co.
RICHMOND — Smith-Courtney
ROCHESTER, N. Y. — Erskine-Healy
ROCKFORD, ILL. — Mid-States Industrial Corp.
SAGINAW, MICH. — Reichle Supply Co.
ST. LOUIS — Colcord Wright Machinery & Supply Co.
SALT LAKE CITY — Salt Lake Hardware Co.
SAN FRANCISCO — Harron, Rickard & McCone Co.
C. W. Marwedel
SEATTLE—Cragin & Co.
Seattle Hardware Co.
SHREVEPORT—Van Horn & Co.
SOUTH BEND—So. Bend Sup. Co.
SPRINGFIELD, MASS.—Carlisle Hardware Co.
SYRACUSE — Syracuse Supply
TAMPA—Cameron & Barkley Co.
TOLEDO—Cornell Supply Co.
Kirby Mach. & Supply Co.
National Supply Co.
TORONTO —
Canadian Fairbanks-Morse
TROY, N. Y. —Fred K. Blanchard
TULSA—Mach. Tool & Sup. Co.
VANCOUVER, B. C.—Crossman Machinery Co., Ltd.
WORCESTER, MASS. — Waite Hdw. Co.
YORK, PA. — York Machy. & Supply Co.

PITTSBURGH

J. H. Thomas, Chapter Publicity Chairman
7442 Pennfield Court, Pittsburgh

Life begins at 6:40 P.M. for Pittsburgh Tool Engineers. At that time on October 8th the opening meeting of the fall season was held in the Norse Room of Fort Pitt Hotel. Our host for the evening was genial Harry Barney, President of "The Barney Machine Co." and a loyal member (a loyal member is one who attends all meetings and pays his dues) of Pittsburgh Chapter. After a fine dinner and a short business meeting Mr. G. H. Fobian, Sales Manager of The Oil Gear Company presented an illustrated talk on oil gear equipment, details of this talk are given elsewhere in the "Tool Engineer."

Mr. John Bunker was absent, being in Florida for his annual vacation.

The story is about that Dave Renny died and went to Heaven. When St. Peter met him at the Golden Gate, he asked his name and occupation. When he replied, "Tool Engineer," St. Peter was very much surprised. He said, "There must be some mistake, we have not had a Tool Engineer here for centuries. You wait here while I check the records." After checking the "Good Book" St. Peter discovered he was wrong, so he hurried back to the "Golden Gate" and when he got there Dave was gone — and so were the Golden Gates.

Action has been started to change our meeting place for next month. So check the announcements before you start to the meeting.

The subject for our next meeting is "The Built up Edge." Any person who deals with cutting metal will find this meeting has for him the latest information on the science of cutting material. It will be presented in fine form. All statements will be verified by actual pictures of cuts in progress.

We are proud to have two directors for "The National Board of A.S.T.E." from Pittsburgh Chapter — they are Mr. J. R. Weaver, and Mr. L. D. Rigdon.

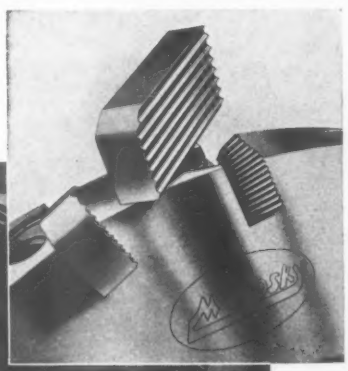
McCROSKY

Tru-Ground

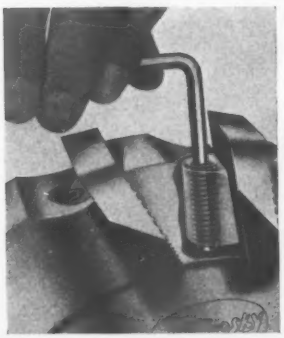
SERRATIONS

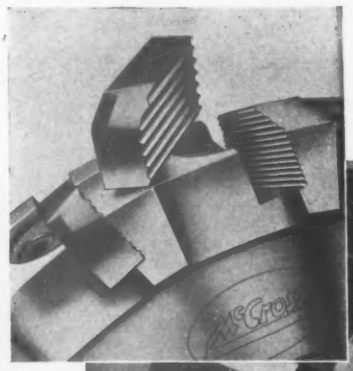
GROUND FROM THE SOLID

A new feature in blades for JACK-LOCK tools

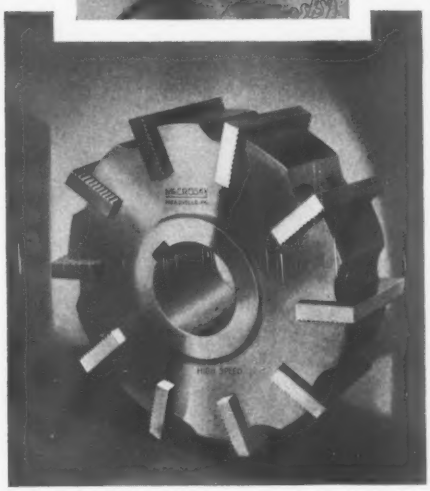


McCrosky serrated blades are locked by the powerful JACK-LOCK wedge





TRU-GROUND Serrations in Stellite blades —ground from the solid



TRU-GROUND Serrations in high speed blades—ground from the solid after hardening

TRU-GROUND Serrations in tungsten carbide blades—ground from the solid after brazing

McCROSKY TRU-GROUND SERRATIONS produce an improved design of blade that meshes more perfectly with body serrations and adjusts more easily. Each alternate tooth in the blade is omitted, but no teeth are omitted from the slot serrations; compare blade and slot serrations shown above. By the TRU-GROUND method truer serrations can be ground in Stellite at reduced cost; warpage of serrations in high speed steel is eliminated; tungsten carbide tipped blades are locked more rigidly. The design of TRU-GROUND serrations and method of producing them are covered by patent applications. TRU-GROUND Serrations are used exclusively in McCrosky JACK-LOCK Tools. Send for descriptive bulletin.

McCrosky Tool Corporation, Meadville, Pa.

Sales Offices: Detroit, Chicago, Cleveland, New York, Philadelphia

Production Perspectives

(Continued from Page 18)

orders to concerns in New England, sharing in this widely distributed business. Some manufacturers and dealers are reported to have had sufficient stocks of 1937 models unsold, owing to third-quarter business falling below calculations, to stay the rush of production of new models. However, producers of **drop forgings have a stimulus from this industry,** and good production of ignition sets, timers chains and other units is forecast from this month on. Woolen concerns specialing in automobile upholstery cloth in western New England, are reported as quite busy.

Another strong business prop is seen in the **continued large scale production of machine tools,** which is reported to have had a moderate spur in new foreign orders placed recently. While **large business of this nature is talked of** as a result of state department licenses for the export to Russia of prefabricated parts of battleships, guns and other armament equipment, **actual purchases involved in this case are reported to be well in the future,** in any case, and subject to new developments that may arise in the international situation.

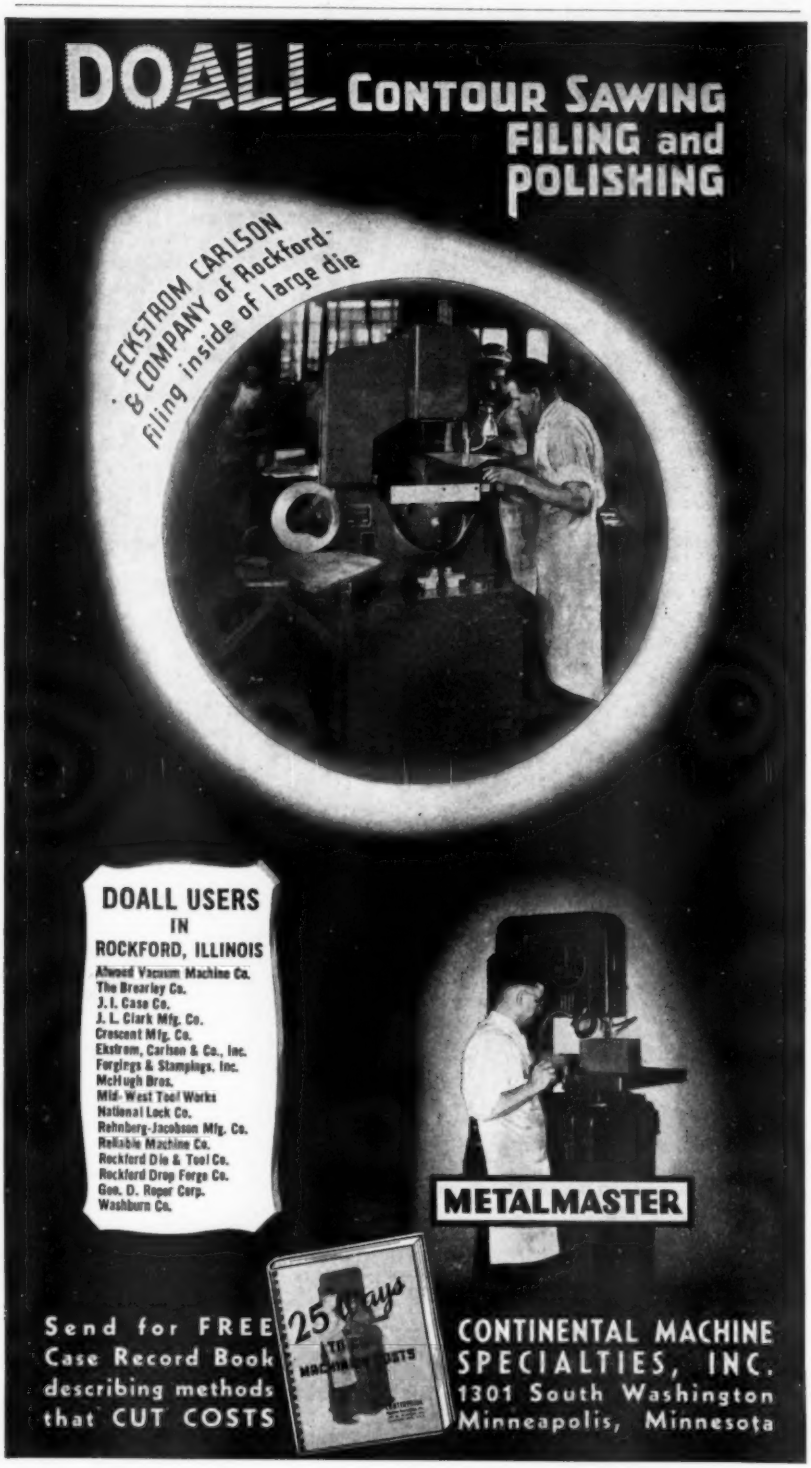
Transfer of production of small compressors from the Buffalo, N.Y., to the Holyoke, Mass., works of the **Worthington Pump and Machinery Corporation,** which is approaching completion, is expected **to add some 200 or more workers to the plant force** when this department is in full swing.

The awarding of a $697,366 contract to the Westinghouse Electric & Manufacturing Company for the manufacture and installation of radio beam and transmission equipment of the simultaneous transmission type for 44 new Department of Commerce airways stations is expected **to furnish a new boost to operations at the Chicopee Falls,** Mass., plant of Westinghouse, which has been kept busy through the season on radio and cooling cabinet work. **Demand for aircraft products** of various kinds **has done much to keep metalworking** plants **busy** in this territory.

Little reduction is reported in the numbers employed in most manufacturing lines, **though there has been an appreciable drop in man hours,** due to less overtime work and resort to short-time schedules in preference to laying off workers. **The latter device is particularly avoided by employers of skilled labor,** which, once released, cannot be called back readily under the present labor-scarcity conditions.

Preparations are being rushed by the new Nonotuck Manufacturing Company, Holyoke, Mass., formed for the purpose of drawing copper wire. This concern is a subsidiary of the Holyoke Wire and Cable Company, formerly called the Holyoke Company, having two plants in operation in the same city. The last-named company manufactures covered wire and can therefore utilize much of the products of the new concern.

(Continued on Page 46)


DOALL CONTOUR SAWING FILING and POLISHING
ECKSTROM CARLSON & COMPANY of Rockford- filing inside of large die
DOALL USERS IN ROCKFORD, ILLINOIS
Ahnood Vacuum Machine Co.
The Brearley Co.
J. I. Case Co.
J. L. Clark Mfg. Co.
Crescent Mfg. Co.
Ekstrom, Carlson & Co., Inc.
Forgings & Stampings, Inc.
McHugh Bros.
Mid-West Tool Works
National Lock Co.
Rehnberg-Jacobson Mfg. Co.
Reliable Machine Co.
Rockford Die & Tool Co.
Rockford Drop Forge Co.
Geo. D. Roper Corp.
Washburn Co.
METALMASTER
Send for FREE Case Record Book describing methods that CUT COSTS
25 Ways
CONTINENTAL MACHINE SPECIALTIES, INC.
1301 South Washington
Minneapolis, Minnesota

BUY BARBER-COLMAN GROUND HOBS *for Accuracy*

CHECK...AND CHECK AGAIN

All the elements of tooth form in Barber-Colman Ground Hobs are checked carefully. Then the helix of the hob is checked from point to point with equal care to be sure that it is accurate and true. Barber-Colman Ground Hobs are checked . . . and checked again many times to be sure that they are correct in every detail. As a result, you can buy Barber-Colman Ground Hobs for accuracy—for productive capacity, for value—and be sure of getting the finest hobs that can be produced.

BARBER B-C COLMAN

PRODUCTS

MILLING CUTTERS, HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, SPECIAL TOOLS

BARBER-COLMAN COMPANY

General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

CLEVELAND, OHIO
Barber-Colman Company
3030 Euclid Avenue

DETROIT, MICHIGAN
Hodges Machinery Company
544 New Center Building

MILWAUKEE, WISCONSIN
Dumser & Schroeder
610 West Michigan St.

ENGINEERED PRODUCTION
EXAMPLES FROM THE SUNDSTRAND FILES
No. 3726

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Advantages of Model 10 Stub Lathe Increase Bushing Production, Cut Cost

The Sundstrand Model 10 Stub Lathe shown in Fig. 1 cuts cost and increases production on cast bronze bushings, some of which are shown in Fig. 2.

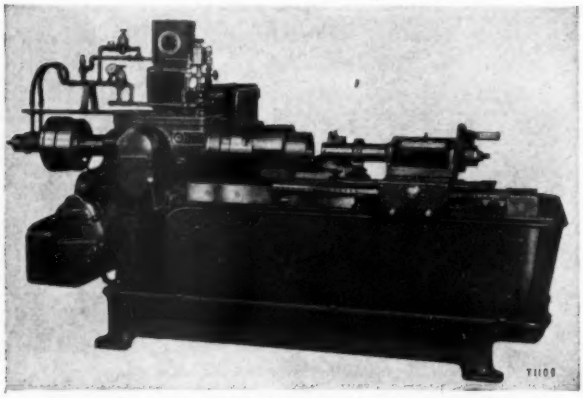


Fig. 1 — Sundstrand Model 10 Stub Lathe with special equipment for machining bronze bushings.

Machining these parts to the close limits required would be simple enough but—30 or more different sizes, ranging from 2⅜″ to 8″ diameter and 2″ to 10″ long, must all be roughed and finished on one machine; lots seldom exceed 20 of any one size; some bushings are plain, others flanged. Castings are first chucked on the o.d.; rough-bored, finish-bored, faced. Then the parts are mounted on an expanding arbor or chuck for rough- and finish-turning. The automatic cycle, high-speed rapid traverse, simple tooling requirements, and easy set-up of the Sundstrand Model 10 Stub Lathe save time, cut costs, increase production, and make it easy to change from one size bushing to another.

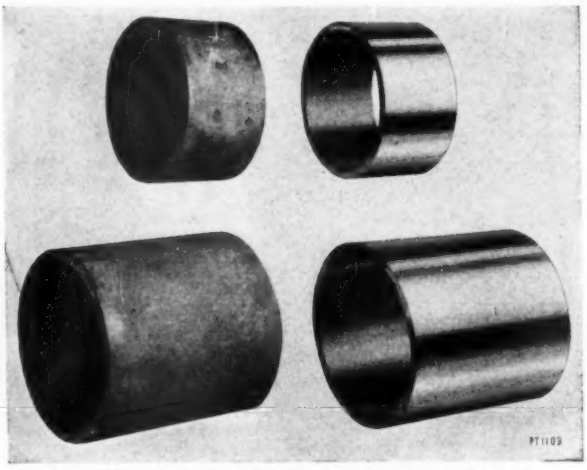


Fig. 2 — Two of many sizes turned are shown above; rough at left, finished at right. Flanged bushings also turned on same Stub Lathe.

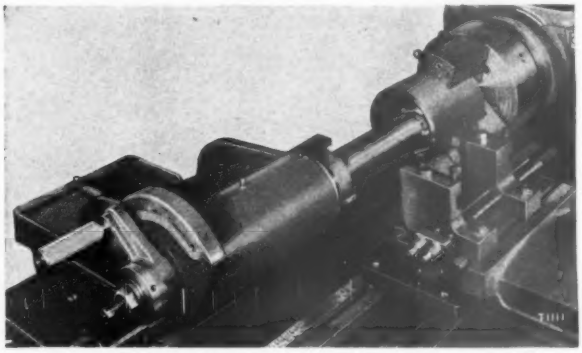
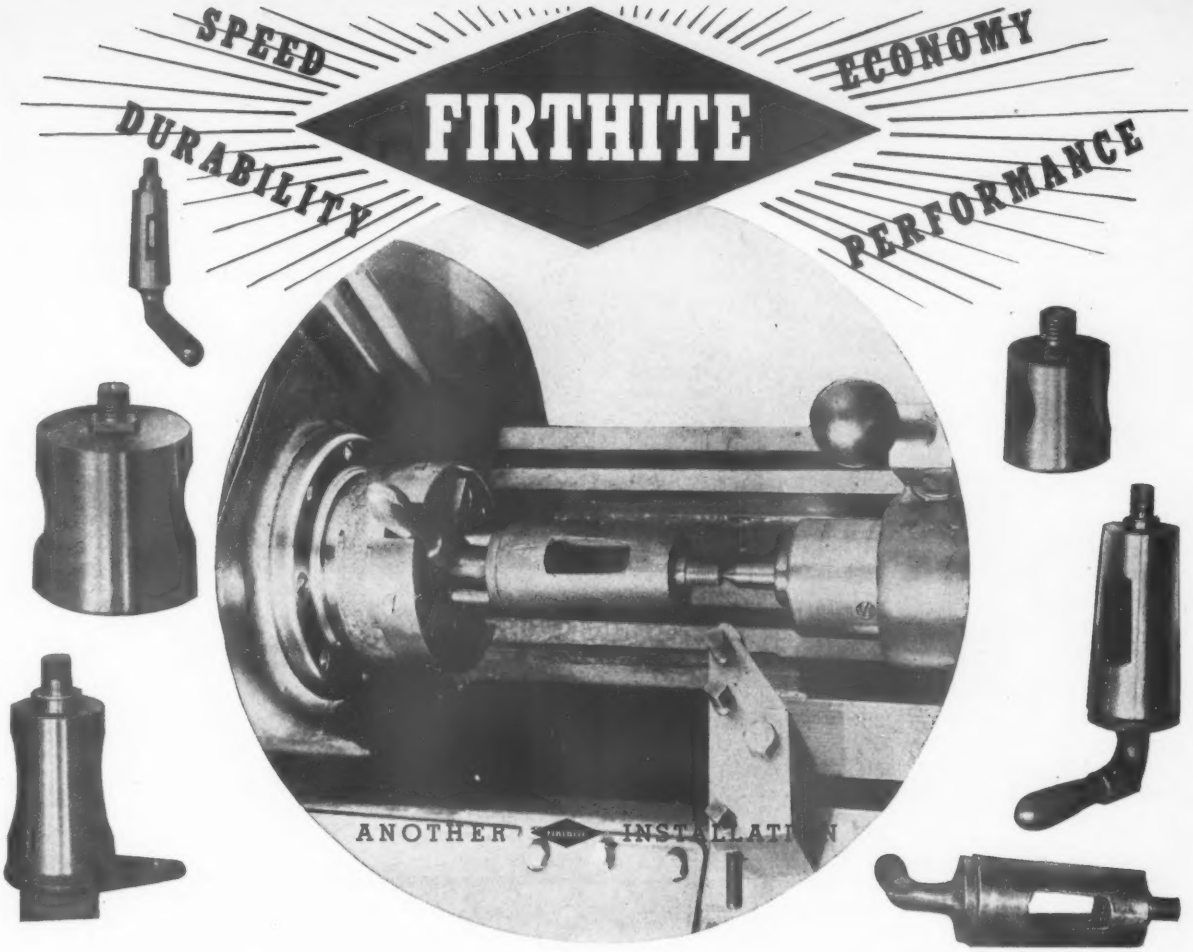


Fig. 3 — Showing special 2-position boring bar, one of several special features which facilitate production.

Sundstrand engineering participated by providing the 2-position boring bar, shown in Fig. 3, and other tooling; special long feed for front carriage, additional spindle speed changes, and the small number of fixtures necessary to handle all sizes of these bushings. Highly effective on this job, the combination of Sundstrand Engineered Production and Model 10 Stub Lathes (or other Sundstrand machine tools) has been equally successful on many other kinds of work. Investigate! See what they can do for you.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

RIGIDMILS - STUB LATHES
Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery



FOR SUSTAINED ACCURACY USE FIRTHITE

Despite the intermittent character of the cut due to the transverse slot through the valve inserts, FIRTHITE Tools produce hundreds of large cast brass valve plugs from 4" to 11½" dia., all of which easily pass the exacting "prussian blue" test for percent of bearing.

FIRTHITE Sintered Carbide Tools faithfully reproduce on all sizes of valve plugs, the fine accuracy built into this Sundstrand Lathe.

TYPICAL CYCLES ARE: (On a 4.9" length cut)

For Roughing—35 seconds floor to floor time. 585 feet per minute, 0.015" feed, 3/32" cut. (at the rate of 87 pieces per hour assuming 81% efficiency).

For Finishing—50 seconds floor to floor time. 980 feet per minute, 0.005" feed, 1/64" cut. (at the rate of 61 pieces per hour at 85% efficiency)

FOR SUSTAINED ACCURACY AND HIGH PRODUCTION USE FIRTHITE

FIRTH-STERLING STEEL COMPANY

Works: McKEESPORT, PA.
NEW YORK CHICAGO
HARTFORD PHILADELPHIA
LOS ANGELES DETROIT
CLEVELAND DAYTON
GLOBE WIRE DIVISION
McKEESPORT, PA.

Production Perspectives

(Continued from Page 42)

The Reed-Prentice Corp., Worcester, Mass., is **celebrating** its **65th anniversary** this year. The company traces its history back to 1872 when F. E. Reed Co. was founded for the manufacture of lathes.

The Bausch Machine Tool Company plant has been **conveyed to the city of Springfield** in a tax title deed. The **city took title** to the property August 18 **for nonpayment of taxes** and interest **in the sum of $6,538.86** of which $6,185.68 was in delinquent taxes.

Henry L. Hanson, machine tool manufacturer at 25 Union Street, Worcester, is **bringing out a novel product** to be known as **Yard-O-Meter.** This is a device to be sold **golfers so they may calculate the yardage from their ball to the cup.**

The largest volume of unfilled orders in the company's history, at a time of the year when unfilled orders are normally at their lowest point, **was reported** by **President E. L. Stoughton of the Wico Electric Company.** Demands being made on the company's productive facilities are so heavy that consideration is being given to new financing to provide increased inventory and new machinery and equipment the report states. **The Barrett Company, Worcester, has been expanding steadily.** Recently, **Harold F. Peavey** of Springfield was **engaged** as **chief engineer.** Mr. Peavey has had a wide exprience in manufacturing plants. He has been a research engineer for automotive and affiliated companies for several years. The **O. S. Walker Co., Inc.,** Worcester, manufacturers of magnetic chucks and small grinding machines, has recently put a new demagnetizing device on the market. **Eugene A. Sisson,** treasurer and general manager of Economic Machinery Co., Worcester, died recently.

Mrs. **Emma Clark, wife of Benjamin W. Clark,** treasurer of the Graffam Metal Products Co., Worcester, **died recently.** At the clambake held by the office forces of the **L. S. Starrett Company, Athol, Mass.,** at Camp Cheneo in Orange recently, **Miss Mary C. Hoyt** who **recently completed 50 years' service** with the company **was presented a wrist watch** by **Frank A. Ball,** president of the company in behalf of the concern. Miss Hoyt is employed in the superintendent's office.

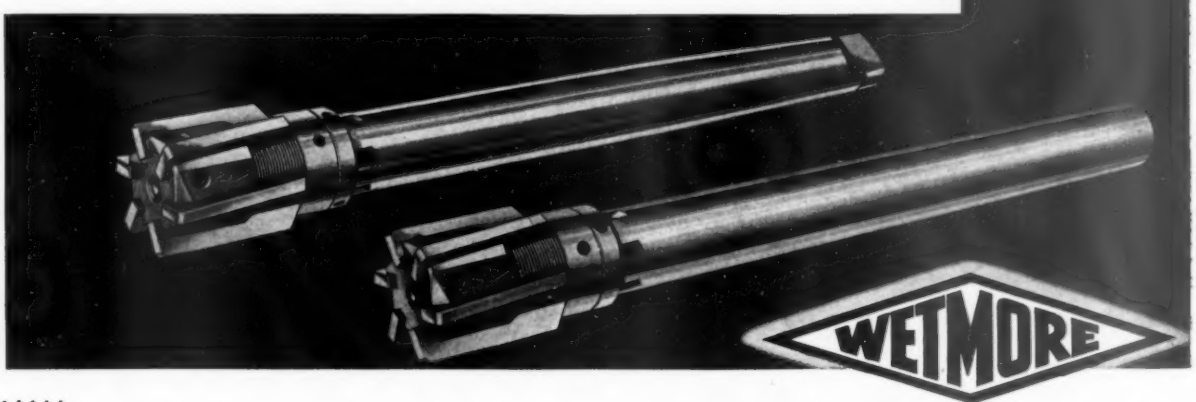
Joseph M. Splaine of the **Heald Machine Co.,** Worcester, has been added to the teaching staff of the Worcester Boys' Trade School. Mr. Splaine has a long record of success as a tool maker and has had experience in many of the city's plants. He will be an instructor in tool making in the school's machine division. **Completing 50 years** in the employment of **Graton & Knight** Co., Worcester, **John Kennedy** has been **presented a commemorative plaque,** a check and a 50-year pin by Frederick E. Barth, president of the company. New 1938 models are in production at the Indian Motorcycle Company plant, Springfield. **W. A. Neill,** formerly manager of the Worthington Pump & Machinery Corporation's airtool and portable compressor devision in Harrison, N.J., **has been appointed manager of engineering and sales activities** of the company's recently reopened plant **in Holyoke.**

Norton Co., Worcester, has **brought out a re-designed model of its multi-purpose grinder.** The new machine is designed for direct motor drive, in that its principal mechanisms are each driven by an individual motor. Five motors are used in its operation and either external or internal grinding is possible. The

(Continued on Page 49)

THE STANDARD OF QUALITY AND ACCURACY IN ADJUSTABLE MACHINE REAMERS

The Type No. 11 Wetmore Reamer is known for ease of adjustment, long blade life, cutting performance . . . because of the famous Wetmore design. Write for Catalog No. 36.



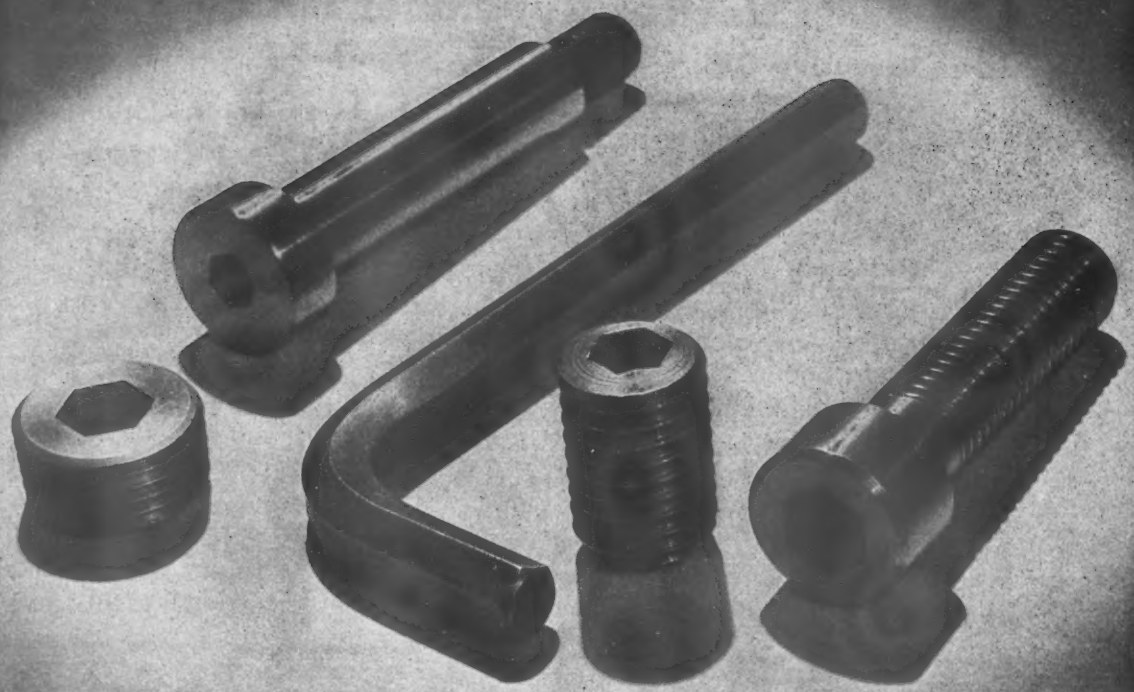
• SPECIAL TOOLS

Designers and tool engineers are invited to avail themselves of our counselling service on all reaming operations — standard or special. We build practical and efficient special tools to decrease your manufacturing costs.

WETMORE REAMER COMPANY, Dept. TL, 420 N. 27th St., Milwaukee, Wis.

FIBRO FORGED *Socket Screws*

TRADE MARK



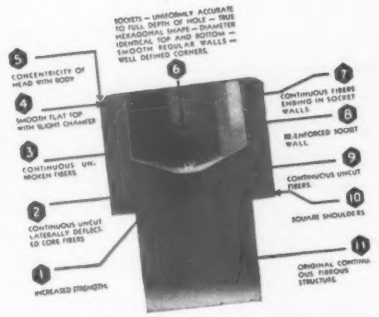
The QUALITY SOCKET SCREWS!

the Results of an Entirely New and Better Method of Socket Screw Manufacturing

Patented by HOLO-KROME

FIBRO FORGED SCREWS
the Standard of Value

New and Better Method of Manufacturing resulting in Continuous Fibres — Special Analysis Chrome Nickel Alloy Steel — Controlled Grain Size — Atmospherically Controlled Heat Treatment — TEN-TOR Testing (exclusively Holo-Krome) to determine the necessary physical properties.


SOCKETS — UNIFORMLY ACCURATE TO FULL DEPTH OF HOLE — TRUE HEXAGONAL SHAPE — DIAMETER IDENTICAL TOP AND BOTTOM — SMOOTH REGULAR WALLS — WELL DEFINED CORNERS
5 CONCENTRICITY OF HEAD WITH BODY
4 SMOOTH FLAT TOP WITH SLIGHT CHAMFER
3 CONTINUOUS UNBROKEN FIBERS
2 CONTINUOUS UNCUT LATERALLY DEFLECTED CORE FIBERS
1 INCREASED STRENGTH
6
7 CONTINUOUS FIBERS EMBEDDED IN SOCKET WALLS
8 REINFORCED SOCKET WALL
9 CONTINUOUS UNCUT FIBERS
10 SQUARE SHOULDERS
11 ORIGINAL CONTINUOUS FIBROUS STRUCTURE

Screws for Test Sent FREE
Write — Engineering Department

HOLO-KROME FIBRO FORGED TRADE MARK SCREWS

THE HOLO-KROME SCREW CORP., HARTFORD, CONN., U.S.A.

Q-C ENGINEERING

Effective November 1st

Our Executive Office, Sales and Engineering Department will be located at

2842 West Grand Blvd.
Detroit, Michigan
Phone: TRinity 1-2340

Our increased facilities will permit us to render to an enlarged clientele a continuance of the type of service which through the years has proven the reliability of this organization to serve our customers to their complete satisfaction.

A complete service: Designing, Building, Dies, Jigs, Fixtures and Special Machinery supplemented by a most extensive line of Standardized Fixtures, Fixture Locks, Index Tables, Locating Pins and Rest Buttons, Live Centers, etc.

Q-C ENGINEERING PRODUCTS

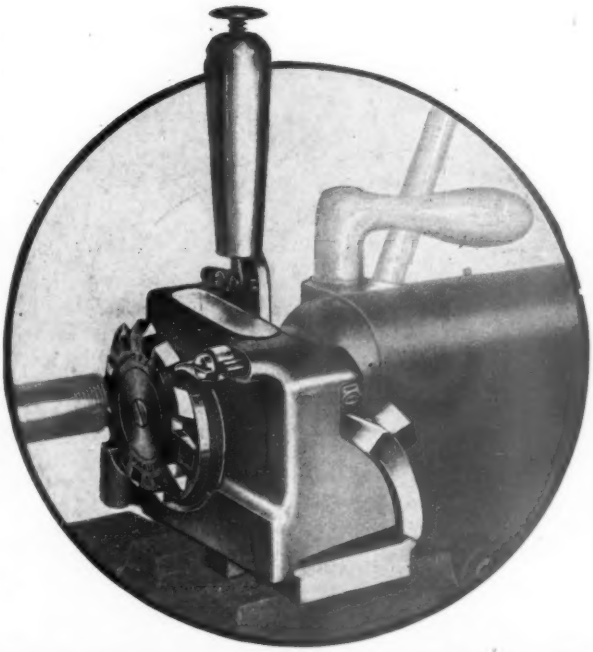
2842 W. Grand Blvd. **Detroit, Michigan**

RIVETT IMPROVED THREAD TOOL

Mounts on any screw cutting engine lathe. An unskilled operator can use it. For any diameter or form (except square) of six pitch or finer.

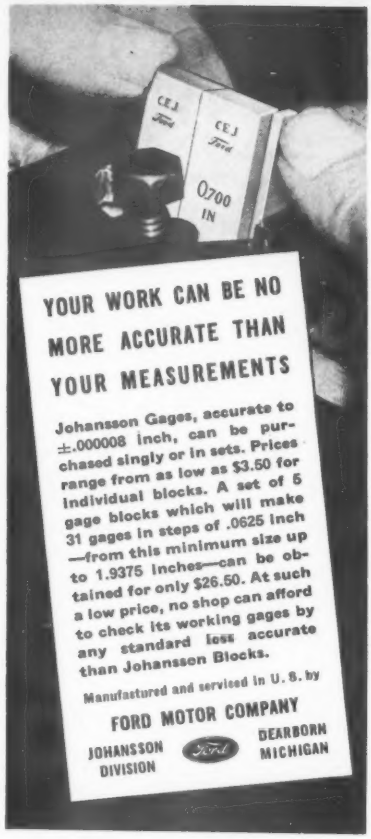
THE THREAD TOOL is a holder for a ten tooth cutter with means for indexing the cutter to present each of the ten teeth successively to the work, and with adjustments for controlling the size of the finished thread.

THE CUTTER is a disc of the best tool steel with ten teeth, each tooth having a prescribed increase in radial length over the preceding tooth, thus comprising, in effect, ten cutting tools. The first nine teeth rough out the thread progressively in nine heavy measured cuts, and the tenth tooth finishes the thread. The responsibility of the operator is reduced to indexing the cutter and reversing the lathe. The thread tool does the rest.



Bulletin 110-A

RIVETT LATHE & GRINDER, INC.
BRIGHTON, BOSTON, MASS.


YOUR WORK CAN BE NO
MORE ACCURATE THAN
YOUR MEASUREMENTS
Johansson Gages, accurate to ±.000008 inch, can be purchased singly or in sets. Prices range from as low as $3.50 for individual blocks. A set of 5 gage blocks which will make 31 gages in steps of .0625 inch —from this minimum size up to 1.9375 inches—can be obtained for only $26.50. At such a low price, no shop can afford to check its working gages by any standard less accurate than Johanssen Blocks.
Manufactured and serviced in U. S. by
FORD MOTOR COMPANY
JOHANSSON DIVISION
DEARBORN MICHIGAN

Various Thread Forms, Uses

(Continued from Page 17)

U.S. Form may better serve the same purpose, for it would have the same rapid action, plus the easier machining qualities of the U.S. Form.

When deciding on the proper thread to use, first answer these questions:

1. Can the thread be machined economically?
2. Does the thread have the necessary qualities for strength and wear resistance?
3. Will the root diameter of the thread be strong enough to support the torque of the cut?
4. Might a 60° U. S. Form be used to just as good an advantage?

A thorough investigation into properties required of a thread, through an analysis of its application, may be the means of a considerable reduction in estimated machining cost. It will be a wise move to consider thoroughly before specifying special thread forms.

Production Perspectives

(Continued from Page 46)

hand-operated grinding wheel feed permits the operator to gauge work within a hundred thousandth of an inch.

Examine ECLIPSE BALANCED DRIVE *inverted* SPOTFACERS . . . .

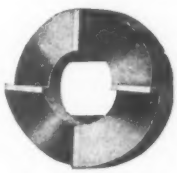
In Daily Use

by the leading manufacturers of radial airplane engines for careful machining of bolt holes on cylinder flanges.

ECLIPSE developed this popular rugged, long lived tool for back spotfacing or counterboring inaccessible surfaces not readily machined in the usual manner.

Eclipse balanced drive allows a free fit of the cutter on pilot, making it possible to remove and attach cutter while machine is in motion—thus economizing overall cutting time.

Rapid availability on cutters — diameters from ½" to 2¾" are carried in stock and standard sizes of pilots to correspond, for immediate shipment.



Note the two integral parallel drive flanges at the lower end of this cutter, permitting long regrinding life.

Balanced Drive Inverted Spotfacer pilots available in Morse Taper shank or Eclipse Pin Drive.

ECLIPSE COUNTERBORE COMPANY
DETROIT 7410-30 ST. AUBIN AVE MICHIGAN

NEW *Equipment*

New J & L Automatic Thread Grinding Machine

The Jones & Lamson Machine Company of Springfield, Vermont, announces a new J & L Automatic Thread Grinding Machine. This new machine is designed to grind threads in hard or soft material on work up to 8 inches in diameter when using a 20-inch grinding wheel. Work 48 inches long may be held between centers, and 18 inches of thread may be ground anywhere on 36 inches of work length. Work 11½ inches in diameter may be swung over the work slide and 11½ inch diameter threads may be ground when the wheel is 16½ inches in diameter, or smaller. A 20 inch diameter grinding wheel is furnished as standard, and, as the wheel decreases in size, the proper peripheral speed may be retained through rheostat control of the whole motor.

The helix angle capacity of the new machine has been increased to include 25 degrees right hand and 30 degrees left hand. The helix angle is adjusted or changed by means of a worm and gear.

Standard equipment includes change gears for pitches from 2 to 48 inclusive. The machine will grind single, double, triple, quadruple and sextuple threads, either right or left hand. Using a simple hardened and ground former, it will grind taper, combination of straight and taper, or double taper threads. Accurate reproduction of taper is assured. The grinding wheel is always at right angles to the axis of the work, therefore, no adjustment of thread form is required when changing from straight to taper threads, and the J & L method of grinding taper threads makes lead compensations unnecessary.

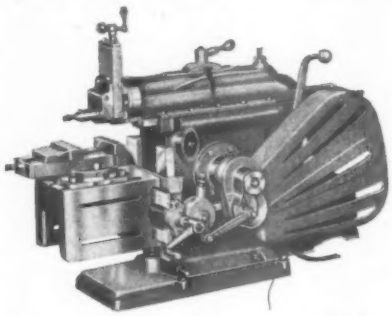
The new machine, with the necessary attachments, will grind button type hobs and circular chasers without lead; it will back off, or relieve, straight or taper hobs or taps with either straight or spiral flutes. A standard attachment may also be furnished for grinding interrupted threads on straight or spiral fluted taps.

The self-trueing, self-sizing mechanism of this machine brings thread grinding into the range of practical shop operations. It is suited equally well to tool room and production work.

▼ ▼ ▼

New Atlas Bench Shaper Announced

Built for improved efficiency, economy, and versatility on small work, the new Atlas 7-inch Shaper reflects careful study, sound engineering, and a thorough knowledge of current tool room and production requirements. This is the latest addition to Atlas machine tools, which now include back-geared lathes, sensitive drill presses, mechanical and hydraulic arbor presses.



(Continued on Page 52)

SWARTZ

LOCKS . . FIXTURES . . TOOLS . . DESIGNING

LL-Type Fixtures

The light duty lock operated line is designed to meet the requirements for direct clamping type fixtures with guide and draw posts on the center line, lighter in weight than our heavy duty line, yet of sufficient rigidity and durability to cover all requirements.

SWARTZ TOOL PRODUCTS CO. Inc.

5259 WESTERN AVE. DETROIT, MICH.

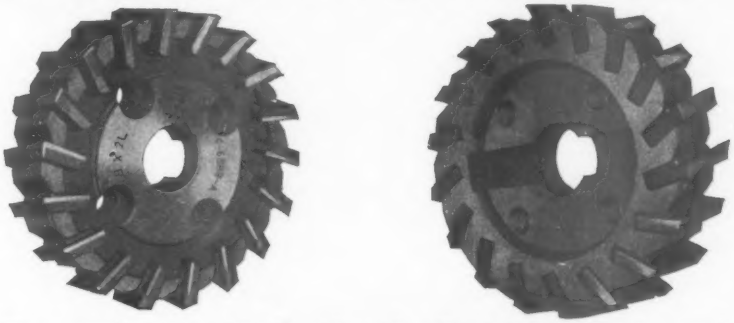
Represented by

Cleveland—J. W. Mull, Jr.
Indianapolis—J. W. Mull, Jr.
Milwaukee—Geo. M. Wolff, Inc.
Tulsa, Okla.—Brammer Machine & Tool Service Co. Inc.

Chicago—Ernie Johnson
Canada—Hi-Speed Tools, Ltd., Galt, Ont.

Oneida, N. Y.—W. F. Himmelsbach
Pittsburgh—J. W. Mull, Jr.
Toledo—J. W. Mull, Jr.
Philadelphia, Pa.—Morgan Tool & Equipment Co.

OUR DESIGN IS THE RESULT OF YOUR EXPERIENCE WITH MILLING CUTTERS



The most economical ratio of adjustment of side and peripheral cutting edges is established by the job itself. That is why the adjustment of GD & GD inserted serrated blade milling cutters is not limited by mechanical construction.

Goddard & Goddard Co.

DETROIT, MICHIGAN

SMALL - BUT EXTREMELY IMPORTANT

so he checks it with

STARRETT TOOLS

and

DIAL INDICATORS

TOOLMAKERS know the value of a well stocked crib of Starrett Tools. They count on them heavily to keep those important special tools, jigs and fixtures accurate to split thousandths. And that goes for machine tool operators and inspectors. They all find features in Starrett Tools and Dial Indicators that help them do better work, do it faster and with less chance of error. Revised Catalog No. 25T describes the complete line of Starrett Precision Tools. Write for it.

THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy Dial Indicators for Every Requirement

Use Starrett Tools

★

Save time and trouble on special tools like this angle parallel or on jig and fixture parts, templates, gauges, etc., by using Starrett Ground Flat Stock. Ask your distributor about it.

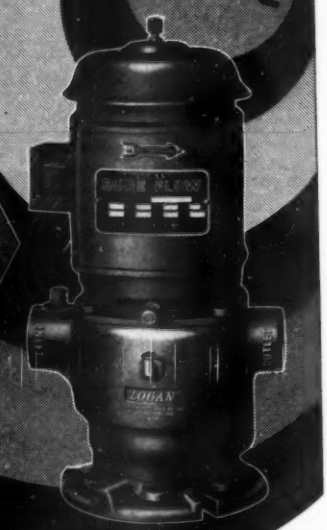
New Equipment

(Continued from Page 50)

The new Atlas Shaper incorporates accepted principles of modern shaper construction. Ram-driving mechanism is bull-gear type; stroke (quick return) is from ½ to 7⅜ inches. Complete V-belt drive from motor to bull-gear spindle provides four speeds between 45 and 200 strokes per minute. Automatic cross feed provides five feeds in either direction between .005 and .025 inches per stroke. The Atlas Shaper is designed to be run from a ½ H.P. 1740 R.P.M. motor. Floor stand is available. All bearing surfaces are large and accurately finished, and complete provision is made for adequate lubrication.

Condensed Specifications: Cutting Speeds 3½ to 116 feet per minute, Table Travel 8½" horizontal, 4½" vertical, Maximum Distance Table to Ram 5⅛", Minimum Distance Table to Ram ⅝". The Atlas Shaper is priced at $215.00. Complete description and specifications are now available—write Atlas Press Company, Dept. 4, Kalamazoo, Michigan.

"LOGAN"



Gives You a CENTRIFUGAL PUMP WHICH IS SELF-PRIMING

BECAUSE it is Self-Priming, The "Logan" Sure Flow is adapted to an unusually wide range of services. It pumps hot or cold liquids; and safely handles chips, filings, abrasives and most corrosive impurities. The "Logan" Sure Flow, with its vertical motor drive, simplifies installation and saves space. It can be mounted entirely away from the source of supply. No part of the pump need be submerged. No foot or check valve is needed in the line.

The "Logan" Sure Flow cuts installation costs, saves valuable space, steps up production and insures greater dependability in the most exacting type of service. Made in ten sizes--4 to 150 gallons per minute. Motor, adapter or belt drive. The new Sure Flow catalog No. 60 will be mailed on request. Write for it today.

LOGANSPORT MACHINE, Inc., Logansport, Indiana

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories.

Sheldon 10 Inch Lathes with Under Motor Drive

Sheldon 10 inch lathes can now be furnished with an Under Motor Drive Attachment either in a cabinet leg, or the unit can be attached directly to the under side of a bench where a bench type lathe is wanted.

The unit provides four speeds by means of two positive clutches on the drive shaft. These clutches are operated by the two levers shown in front of cabinet leg.

There are eight spindle speeds, four direct and four through backgears, and in making these speed changes it is only necessary to turn the clutch levers. There are no belts to shift, no doors or guards to open or remove.

The cabinet leg is provided with a large door to enable the operator to oil the unit and adjust the V-belt tension when necessary.

Sheldon 10 inch lathes swing 10¼ inches over the ways and are furnished in two bed lengths, giving 20 inches and 26 inches maximum center distance. The spindle runs in bronze bearings, has a $1\frac{1}{16}$ inch hole and round collets up to ¾ inch capacity can be used.

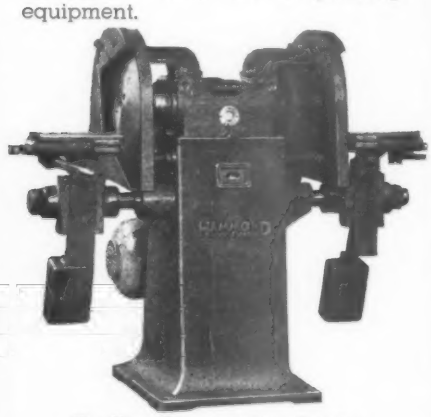
All 10 inch lathes are furnished with semi-quick change gear boxes—with necessary gears for cutting threads from four to eighty per inch.

Either Plain or Worm Feed and Power Cross Feed Aprons can be furnished. Write Sheldon Machine Co., 3251 Cottage Grove Ave., Chicago, for details.

▼ ▼ ▼

New Models CD-18 and CD-20 Hammond V-Belt Disc Grinders

The Hammond Machinery Builders, Inc., Kalamazoo, Michigan, announce the addition of two disc Grinders to their line of grinding equipment.



The New Hammond Disc Grinder

These new models No. CD-18 and No. CD-20, are for 18 inch or 20 inch discs. The spindle is 29 inches long

overall mounted on four Timken Taper Roller Bearings; size of the base at the floor is 24 x 24 inches, and the rocker shaft measures 2½ x 58 inches long. The spindle is driven by either a 5 or 7½ H.P. motor and a Multi-V-Belt Drive is employed.

Universal Lever Feed Tables measure 6 x 11 inches, or plain tables 7½ x 18 inches may be had.

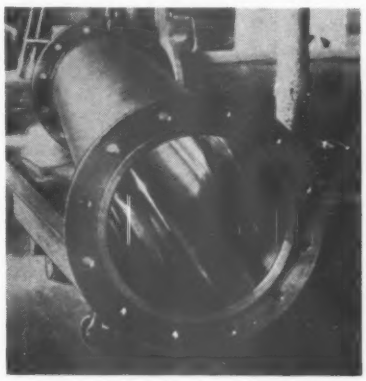
Further information may be had by writing the factory at Kalamazoo, Michigan. Mention The Tool Engineer.

▼ ▼ ▼

New Heavy Duty Air Cylinders

Hannifin Manufacturing Company, 621 South Kolmar Avenue, Chicago, Illinois, has developed a new extra-heavy type of air cylinder especially adapted to steel mill and other heavy-duty applications. The new "LO" series, Hannifin "Heavy Duty" Air Cylinders, combine rugged construction with precision manufacture previously unattainable.

These air cylinders are honed to produce a mirror finish bore that is straight, round, and concentric within .001". The honing operation



is performed on a special long-stroke honing machine, designed and built in the Hannifin shops for this purpose. "LO" Series heavy-duty air cylinders are being made in a full range of standard sizes up to 16" bore, for any length stroke and for air pressures up to 250 lbs. The photograph of the interior of this cylinder shows the honed mirror-finish bore.

▼ ▼ ▼

"Johns" Drill Jigs

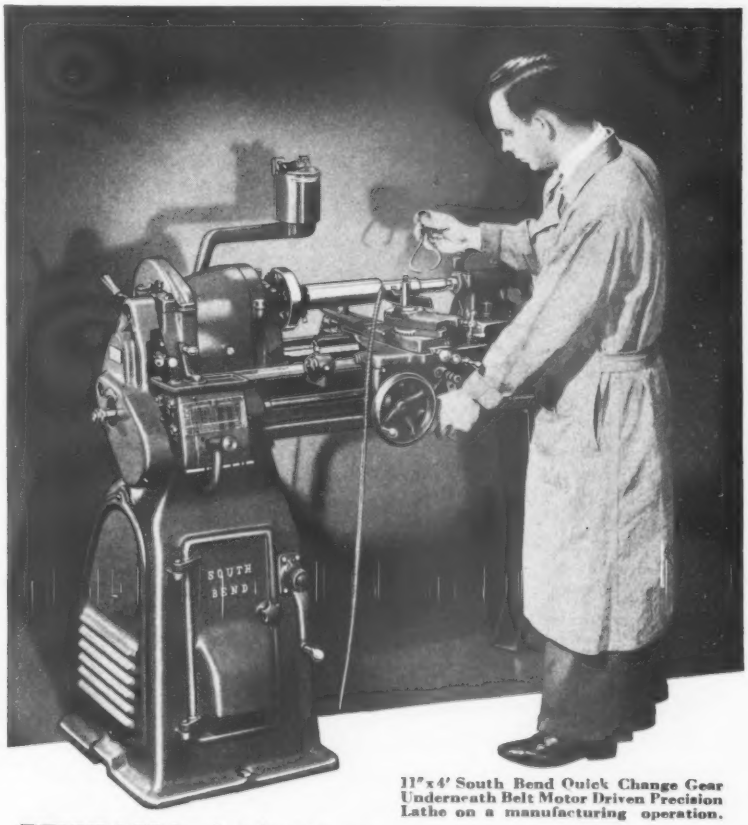
Heuser Manufacturing Company, 1640 N. Paulina Street, Chicago, Illinois, announces a complete re-design of their "Johns" Universal Drill Jigs. These jigs, in use by many of the automobile manufacturers, are particularly useful for many drilling and tapping operations. They are constructed with a suitable base with two master jaws and a right and left hand threaded spindle which assures the jaws always clamping in a fixed place. The master jaws are also arranged so as to accommodate false jaws of any description, thus permitting the clamping of round, square or odd shaped pieces rigidly and in plain view of the operator. A permanent base or a box type base is available. With the box type base special mounting and use in index fixtures for multiple operations is permissible.

An important feature claimed for this tool is the reduction in tooling cost — amounting to as little as one-third of the cost of a specially constructed jig. When writing for details mention "The Tool Engineer."

▼ ▼ ▼

Mall—New Grinder

The Mall Tool Company, 7754 So. Chicago, Avenue, Chicago, Illinois, has recently introduced a new grinder for heavy industrial applihigh speeds and provides fast cutcations. This grinder operates at high speeds and provides fast cut-



11"x4' South Bend Quick Change Gear Underneath Belt Motor Driven Precision Lathe on a manufacturing operation.

HUNDREDS of industries are using the new 11-inch South Bend Series "T" Lathes in their manufacturing plants, machine shops, and tool rooms for production jobs requiring power and rigidity, and for tool and gauge work requiring precision accuracy in doing the most exacting jobs. Fine workmanship combined with new features and design insure handling the most precise industrial operations with speed, accuracy, and versatility.

SOUTH BEND LATHE WORKS
926 East Madison St., South Bend, Ind., U.S.A.

68 Sizes and Types of Lathes for every purpose.

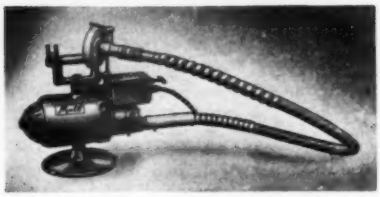
9" lathe prices start at $287
11" lathe prices start at $371
13" lathe prices start at $448
15" lathe prices start at $544
16" lathe prices start at $642

Write FOR BULLETIN

Bulletin No. 11-C illustrates, describes and prices the different models of the 11-inch lathe. Copy sent free, upon request.

SOUTH BEND *Precision* LATHES
MODERN LATHES FOR MODERN INDUSTRY

ting action. It is equipped with a geared head to deliver any one of



the following speeds: 4500, 5500, or 7000 r.p.m., and can be furnished with angle or straight spindles for all types of grinding, sanding, or polishing.

Low round steel bases as illustrated, or high or low caster base mountings for every requirement can be furnished.

Detailed information on this and other Mall grinders will be gladly furnished upon request.

Buying and Selling Time

By Ralph H. Butz

An interesting system to control the purchase and distribution of employes' time has been developed in one plant. Instead of using the old style time clock and one card on which the employe lists the various jobs each day, a separate card is used for each job and the actual working time is printed on the card with an elapsed time recorder.

Job orders are numbered consecutively and the job number is entered on the work card when work is started. The employe then places the card in the recording machine which imprints three miniature clock dials, with an arrow inside one dial to indicate the time work was started.

After the job is completed the card is again placed in the machine to print another dial with the arrow indicating when the job was completed. The other two dials printed on the card at starting time will now have arrows in them to indicate the exact number of hours and minutes the employe worked on that job.

The entire recording operation is mechanical, making it unnecessary for the employe or an office clerk to compute the elapsed time on any job.

On the lower portion of the card are listed the various types of work and the employe checks on this list the nature of the work performed. The card then goes to the office for billing and pay roll entry.

The recorder is equipped with a clutch by means of which all idle periods, such as lunch hour, may be taken from the records. Thus, when work is stopped for the noon hour the clutch is released and again engaged when work is started. No matter how many "out" periods there are, the actual elapsed working time only is printed on the cards. It is possible for a single machine to be used for any number of work cards, irrespective of the order in which jobs are started and finished.

"There was a time," said the superintendent of the shop, "when we permitted the men to keep their own time cards and make the time distribution for the various jobs on which they worked. That was before we really knew that good workmen may be poor clerks, and that even good clerks can not compete with the infallible accuracy of such a mechanism.

"I can still remember how some of the men would sit in the shop trying to figure the elapsed time between, for instance, 7:39 a.m. and 4:14 p.m., with a 45-minute lunch

(Continued on Page 58)

Tapping a hole in Chrome Molybdenum 1⅛" deep — close to bottom — holding to very close limits. With a net production of 350 pieces per hour.

A hard and highly abrasive material. Tough going for any tapping machine. You can see how HASKINS whipped the job.

Everywhere tough jobs are being done in less time and with less effort by the Haskins Method. Everywhere Haskins engineers are helping manufacturers find the fastest, simplest and least expensive way to meet their tapping requirements. They'll gladly do the same for you.

PRODUCTION LINE PROOF—Illustrated above is No. 85 of a series of case histories showing tough jobs made easy—done better and faster—by the Haskins Method.

Material	**Chrome Molybdenum**
Size of Tapped Hole	**5/16"—24**
Depth of Tapped Hole	**1⅛"**
RPM of Tap "in"	**875**
RPM of Tap "out"	**1750**
Production—1st operation	**750 pieces per hour**
Production—Net—2 operations	**350 pieces per hour**

Haskins
Hi-Speed **TAPPING EQUIPMENT**
with Greater Adaptability

"High Speed Precision Tapping," an illustrated booklet, describes the Haskins Tapper in detail. Write for your copy. R. G. Haskins Company, 4642 West Fulton Street, Chicago.

A NEW CUSHMAN CHUCK CATALOG

NUMBER 50-1937

By far the most comprehensive handbook of modern Chucking Equipment yet compiled. In addition to description and price listings of the unusually complete Cushman Line of Precision-built Chucks, this new catalog gives for the first time a full listing of chucks adapted to the New American Standard Types A-1 and D-1 and the Long Taper Key Drive Spindle Noses. Several important new chucks are included, together with progressive improvements in design of standard types.

A unique feature of great value to design engineers and engineering departments is the inclusion of large scale blue prints and full dimension data for all chucks, jaws and component parts.

Address your inquiries direct to

THE CUSHMAN CHUCK COMPANY
Chucking Engineers Since 1862
HARTFORD, CONNECTICUT

CUSHMAN CHUCKS

THE UTILITY SLEEVE
Removable Taper Shank
TOOL DRIVER

CUT SMALL TOOL COSTS

SIMPLE, POWERFUL, POSITIVE, ACCURATE.

For:
TAPS
DRILLS
REAMERS
END MILLS
COUNTERSINKS
CENTER DRILLS
COUNTERBORES
WOODRUFF CUTTERS
TAPER PIN REAMERS, ETC.

THE J. C. GLENZER COMPANY
Detroit, - - - - - - Michigan

Mall Portable Flexible Shaft Grinders
TRADE MARK

A type and size for every grinding, sanding, polishing, and buffing requirement!

POWERFUL EFFICIENT COST CUTTING TOOLS

Write for descriptive literature and let us assist you in selecting the unit best suited for your work.

MALL TOOL COMPANY
Portable Power Tools & Flexible Shaft Equipment
7754 South Chicago Avenue
CHICAGO, ILLINOIS
Detroit Office: 8508 Gratiot Ave.
Milwaukee Office: 1027 W. McKinley Ave.

FOR FASTER, MORE ECONOMICAL PRODUCTION

STANDARDIZE ON THE ORIGINAL

TRADE OK MARK

TOOL SYSTEM

OF INSERTED-BLADE METAL CUTTING TOOLS

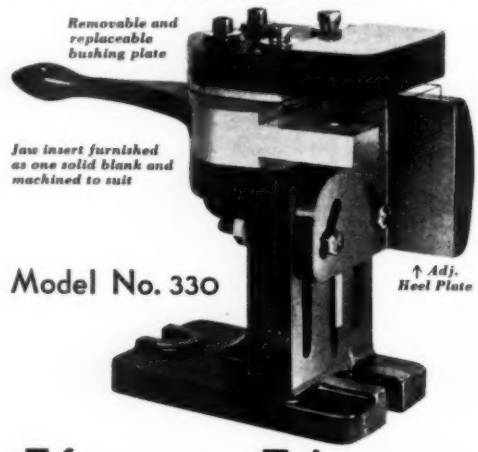
MILLING CUTTERS • END MILLS • FACE MILLS • BORING HEADS
REAMERS • COUNTER BORES • MULTIPLE OPERATION TOOLS
SINGLE-POINT TOOLS FOR LATHES, SHAPERS, PLANERS, BORING MILLS

PRODUCTS OF THE OK TOOL CO., SHELTON, CONN., U.S.A.
Originator of the Inserted-Blade Principle

INCREASE YOUR PRODUCTION and CUT YOUR TOOLING COST

DRILLING *MILLING*

TAPPING — REAMING


Removable and replaceable bushing plate
Jaw insert furnished as one solid blank and machined to suit
Model No. 330
↑ Adj. Heel Plate

KNU-VISE

PRODUCTS COMPANY

6432 CASS AVENUE **DETROIT, MICH.**

Cleveland:
The Brown Tool Company
10465 Carnegie Avenue

Chicago:
Sterling Products Company
121 North Jefferson Street

Brussells, Belgium:
Consortium D'Appareils Techniques
88, Boulevard Maurice Lemonnier

Liverpool, England:
Knu-Vise Products Company Ltd.
21 Grovedale Road, 18

GAGES BY R. & M.

Special Gaging Fixtures

Illustrating a gage to check within thirty millionths the squareness of face with hole of a refrigerator part.

R. & M. MANUFACTURING COMPANY

Detroit, Michigan **Phone MAdison 6135**

Distributed by

SWEDISH GAGE COMPANY OF AMERICA

Detroit - - Michigan

DEPENDABLE

With a Federal Dial Indicator, the ten thousandth test, like the first, is a dependable check in the accuracy of the product. The possibility of human error is negligible, since the unreliable test by touch is replaced by positive visible evidence.
Federal Dial Indicators, in standard or special designs are made for checking every dimension or variable condition which can be converted to linear motion.

FEDERAL
DIAL
INDICATORS
and
DIAL GUAGES

Send for Catalog

FEDERAL PRODUCTS CORP.
1144 EDDY STREET, PROVIDENCE, R. I.
Detroit • Chicago • Muncie • Cleveland • New York

SAVE $100 TO $300 MONTHLY WITH THIS LINCOLN WELDER

You are *bound* to profit by changing over to electric welding with a new Lincoln Machine Shop Welder because:

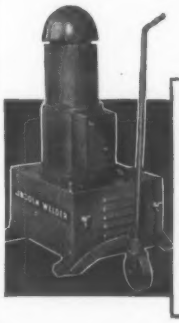
ONE—You can weld twice as fast as with the old process.

TWO—Your welding materials cost one-fourth as much.

THREE—You can fabricate, repair and hard-face more jobs successfully, resulting in savings that can pay for the welder in little time.

Machine shops report savings of $100 to $300 monthly with this powerful, motor-generator type arc welder. Mail the coupon for details.

THE LINCOLN ELECTRIC COMPANY
Largest Manufacturers of Arc Welding Equipment in the World



MAIL THIS COUPON TODAY

THE LINCOLN ELECTRIC CO.
Dept. AE-443, Cleveland, Ohio
Send a free copy of Bulletin 314 and easy payment details on the Lincoln Machine Shop Welder.

Name _____ Position _____
Company _____
Address _____
City _____ State _____

H. R. KRUEGER & CO.
DETROIT, MICH.

★

Manufacturers of
Multiple Drill Heads

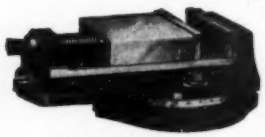
★

Special High Production Machinery

Exclusive Sales Representatives of
W. F. & JOHN BARNES CO.
Rockford, Illinois

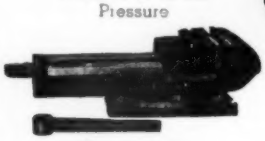
SHELDON
ARBOR PRESSES and VISES

Arbor Presses
12 Sizes
From ¾ to 10 ton
Pressure



Plain and Swivel Milling Machine Vises
4 Sizes
3½ to 8½ inch Jaws

Drill Press Vises
3 Sizes
4½-6½ and 9 inch Jaws



Shaper Vises
2 Sizes
12 and 14 inch Jaws

Ask for No. 25 Catalog and Price List

SHELDON MACHINE CO.
3251 Cottage Grove Ave. Chicago, Ill.

Buying and Selling Time

(Continued from Page 54)

period to be deducted. Or a man would neglect keeping the time records as he passed from one job to another, and at the end of the day he would do some tall guessing to make the time distribution to various jobs and make the figures look reasonable.

"When the time cards and the material requisitions reach the office we have an actual record of both the labor and material to be charged to each job. Tabulations can be made on either a daily, weekly or monthly basis. This can be further elaborated by running in parallel columns the sales and cost figures, showing the gross earnings per job and the total for any period.

"When there are jobs covering a long period and for which many job cards are required, all the cards bearing the same job number are filed until the work is completed. Then the elapsed time shown on all the cards is added, giving us the total time spent on the job."

UNIVERSAL STANDARD
DRILL BUSHINGS
MADE TO A. S. A. SIZES
LOWEST COST -:- LONGEST LIFE
UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

ARMSTRONG

Take the Final Step in EFFICIENCY

the *complete* ARMSTRONG SYSTEM

The first big step in cutting cutting-costs on lathes, planers, slotters and shapers is to replace all forged tools with ARMSTRONG TOOL HOLDERS thereby "Saving all Forging, 70% Grinding, 90% High Speed Steel," ending losses in costly tool stumps and uncertainty in tool performance. The second big step, equally important, is the adoption of the complete Armstrong System—the use of the right ARMSTRONG TOOL HOLDER for each operation.

Over 96% of the Machine Shops and Tool Rooms are using ARMSTRONG TOOL HOLDERS today. Each ARMSTRONG TOOL HOLDER is a permanent multi-purpose tool that with a few cutter bits quickly ground from standard high speed steel shapes, does the work of a complete set of forged tools.

Buy ARMSTRONG TOOLS from your Supply House

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
360 N. Francisco Ave., Chicago, U.S.A.
Eastern Warehouse and Sales:
199 Lafayette St., New York, N.Y.
San Francisco London

Control the speed of your Cylinders

Effect the steady controlled stroke that your installation requires. Pipe one of these in the line from the operating valve to the cylinder, or if both the forward and reverse strokes are to be controlled, pipe one in the line to both ends of the cylinder. Bulletin SC-1 will give you sizes and specifications.

T-J SPEED CONTROL VALVE

The TOMKINS-JOHNSON CO.

624 North Mechanic St., Jackson, Mich.

Detroit Representative
HABERKORN & WOOD

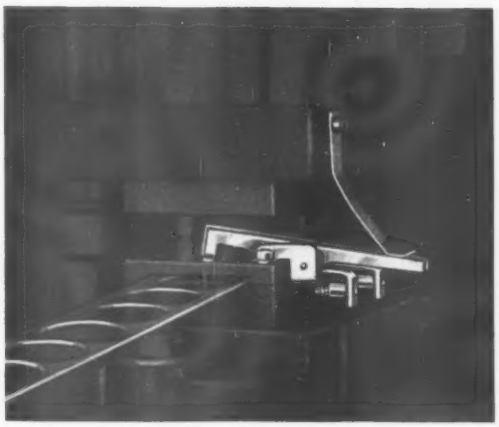
GAMMONS OF *Manchester*

PRODUCTION TOOLS

ORIGINATORS AND
MANUFACTURERS OF HELICAL
FLUTED TAPER PIN REAMERS

THE GAMMONS-HOLMAN CO., MANCHESTER, CONNECTICUT

CUT YOUR COST by using the improved
KRASBERG Automatic and Primary Stops on Your Dies



Showing Automatic Stop, Trip Spring and Primary Stops installed.

$1.50 Will bring you this improved Automatic Stop, the most economical stop for blanking dies. Saves 75% of your automatic stop cost. Can be fitted to any blanking die in 15 minutes. Conventional design—strong—simple—hardened steel. Four sizes, 1 7/8", 2 3/8", 2 3/4", 3 3/8" from Pivot to Front End. Send your order today.

Automatic Stop . . $1.50 Each Primary Stop . . $0.40 Each
(20% Discount in Dozen Lots)

R. KRASBERG & SONS MFG. CO.
1611-1623 N. Wolcott Ave. CHICAGO, ILL.

HANDEE TOOL OF 1001 USES

GRINDS . . . DRILLS . . . ENGRAVES . . .
POLISHES . . . SAWS . . . CARVES . . . ROUTS

Here's the wonder tool that is effecting such revolutionary savings in many laboratories, model and tool rooms and on the production lines. Hard-to-get-at places on machines can now be repaired without removing the part or dismantling machine. The Handee uses 200 different accessories, instantly interchangeable, for work on all metals, alloys, bakelite, celluloid, wood, glass, resins and other hard substances.

Finest, speediest, most powerful tool for its type. 25,000 r.p.m. AC or DC, 110 volts. Weighs only 12 ounces. No shop or factory can afford to be without the Handee. Try one.

De Luxe Model **$18.50** post-paid
6 accessories free

CHICAGO WHEEL & MFG. CO.
1101 W. Monroe St. Dept. AE, Chicago, Ill.

BEST GIFT of all to Deserving Employees

☐ Send Catalog TE11
☐ Send De Luxe Handee on 10-Days Trial
Name .....
Address .....
City ..... State .....

PROCUNIER HIGH SPEED

TAPPING

ATTACHMENTS

"TRU-GRIP"—collet type tap holder. Smallest and lightest of its kind. Most accurate and practical tap holder that ever held a tap.

CLUTCH—double-cone, cork-faced friction clutch. Sensitive, Powerful. Practically indestructible.

BALL BEARINGS—afford rigidity, accuracy, and long life.

REVERSE — speed twice forward speed through Patented Three-Point Balanced heat treated Gear Reversing Mechanism. Less strain and wear.

PROCUNIER—Style "E" high speed tapping heads will cut your tapping costs. Write for new folder.

PROCUNIER SAFETY CHUCK CO.
12-18 SOUTH CLINTON STREET CHICAGO, ILL.

Here is Something NEW

Fig. 1564
Pat. Applied For

A SET SCREW THAT LOCKS ITSELF IN PLACE

Where can you use it?

UNBRAKO

SELF-LOCKING HOLLOW SET SCREW

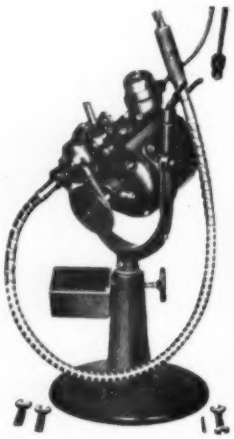
Almost every industrial plant has need for set screws that can be turned tight and depended upon to stay put . . . Do you know of a need for them in your plant? We'll be glad to send you a sample "UNBRAKO" so that you can examine the knurling around the two top threads. This knurling raises sharp prongs all around the edge of the thread which dig right into the threads of the tapped hole when the "UNBRAKO" is being tightened up . . . thus it cannot possibly work loose. Customers have already bought about 2,000,000 "UNBRAKO" SELF-LOCKING SET SCREWS. They agree that once they're tightened up vibration never loosens them.

STANDARD PRESSED STEEL Co.
BRANCHES BOSTON DETROIT INDIANAPOLIS
JENKINTOWN, PENNA.
Box 100
BRANCHES CHICAGO ST. LOUIS SAN FRANCISCO

1905 Strand *1937*

FLEXIBLE SHAFT MACHINES OF HIGH QUALITY

Type MY4—¼ H.P.



Tool and Diemakers Everywhere Know the quality of "Strand" Machines.

Sixty types and sizes ⅛ to 2 H.P.

This Universal Swiveling Machine, our latest development with a right angle hand piece, is in great demand by the tool and die makers. Furnished with speeds of 1700—3000—5200 or 3400—6000—10,400

ROTARY FILES WRITE FOR CATALOG

N. A. STRAND & CO.
5001 No. Wolcott Ave. Chicago

ACME

Standardized Drill Jig Bushings

Plain Stationary Press Fit—Type "P"

Shouldered Stationary Press Fit—Type "S"

Removable Slip—Type "R"

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear — concentric within .0003" full indicator reading.

Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

ACME INDUSTRIAL CO.
202 N. LAFLIN ST.
CHICAGO, ILL.

DO IT --

Better · Faster - For Less!

with ODIN UNIVERSAL

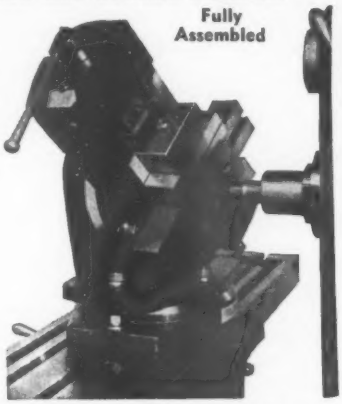
Precision Vises **Swivel and Plain**
with Interchangeable Jaws and
Hardened and Ground Parallels

They quickly pay their costs in savings on High Tool Costs —Expensive Fixtures —Patterns and castings—Extra Set-Ups.

Investigate the money saving possibilities of ODIN VISES

Write today for full facts and prices.

Fully Assembled



Let us show you how to make cheaper and better jigs and fixtures at a greatly reduced cost—with a great saving in time.

ODIN UNIVERSAL CORPORATION
CHICAGO

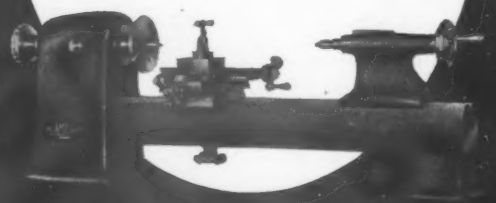
Sales Division
110 S. Dearborn st.,

Telephone
Franklin 3281

New

AMES ENCLOSED HEAD

Precision Lathe with Ball Bearing Spindle and Transitorq Drive. Length 36"—Swing 8⅜"—Collet Capacity 1"—Motor ½ h.p.—Double V-Belt Drive. Send for bulletin.



B. C. AMES CO., Waltham, Mass.

Maxi they're Black Tools

● **Every user of tools who is interested in improvements that LOWER production costs should inform himself on "Maxi" Taps, "Acorn" Dies and "Rex" Gages.**

Every one of these tools can be tested by the user, in his own plant on a "make good or make room" basis. Consult your distributor or get in touch with us direct.

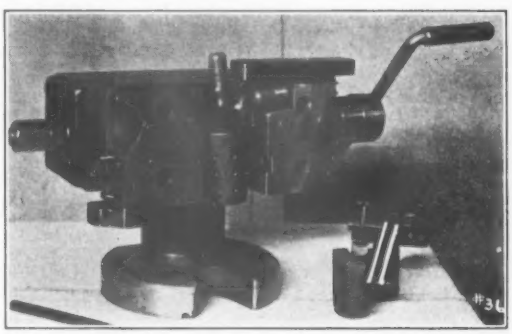
GREENFIELD TAP & DIE CORPORATION

GREENFIELD, MASS.

Our fully equipped tap plant in Detroit gives record service on special taps of all sorts.

2102 WEST FORT STREET, DETROIT
Phone LAfayette 0411

Why Waste Time and Money Building a Separate Base and Clamping Screw for Every One of Your Drill Jigs?



The "JOHN'S" JIG is the common Base with Quick-Clamping Screw for all your future Drill Jigs at 50% of your tooling cost.

Keep your Drill Jig on the drill press and change the jaws as the job comes along.

Let us write you about it.

HEUSER MFG. CO.

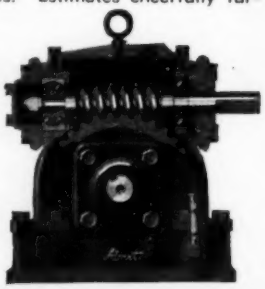
1640 N. PAULINA ST. **CHICAGO, ILL.**

GEARS - Made To Order

Precision cut with extraordinary care. Any Type—Any Pitch—Any Material. No order too large or too small. Prompt deliveries. Estimates cheerfully furnished—FREE.

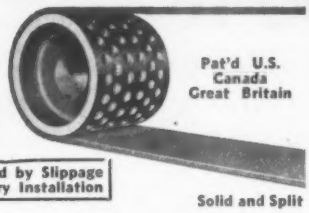
ABART SPEED REDUCERS

Have established a reputation throughout the U. S. for quietness, freedom from vibration, maximum shock absorbance and high efficiency. Many types and sizes in stock. Write for Bulletin 800.



Abart GEAR AND MACHINE CO.
MANUFACTURERS OF
Speed Reducers & Gears
4843 WEST 16TH ST. CHICAGO ILLINOIS

NO BELT SLIPS with Vacuum Cup Metal Pulleys



Pat'd U.S.
Canada
Great Britain

Solid and Split

Shut Off Expense Caused by Slippage
You Save Money on Every Installation

GUARANTEED to:
Eliminate belt slippage and power loss because the belt is sealed to pulley at vacuum contacts . . increase life of belts and equipment . . enable machines to take larger cuts and operate at maximum capacity . . wear indefinitely . . keep belts from flying off . . Sizes from 2" up to 72" . . recommended for short center drives . . Try one at our risk on your worst drive.

Vacuum Cup Metal Pulley Co., Inc.
30 Day Free Trial Offer. 12536 Grand River Ave., Detroit, Mich.

The VINCO

Angle Tangent to Radius Dresser for Internal, External and Surface Grinding Machines

Patented June 5 1934, other patents pending.

ACCURACY AT A SAVING OF 75%

If you are interested in the accurate and economical dressing of angles and radii tangent on abrasive wheels send for our descriptive circular of the Vinco Dresser.

VINCO TOOL CO., 7348 Central Avenue Detroit, Michigan

PORTABLE...

. . . but a Real Machine Tool

OSTER TOM THUMB BOLT THREADER

No. 521

GET the complete story of this money-making "mighty midget" . . . capacity 3/16" to 1-1/4" . . . a star performer whether used by itself or as a helper for a bigger machine. Write

THE OSTER MANUFACTURING COMPANY

Sales Office: 2063 East 61st Street, Cleveland, Ohio
Factories: Erie, Pennsylvania, and Cleveland, Ohio
New York City Showroom and Office, 292 Lafayette St.
Philadelphia Showroom and Office, 111 North 3rd St.

Threading Headquarters Since 1893

Advertisers' Index

Abart Gear & Machine Co.	62	Krueger & Co., H. R.	58
Acme Industrial Co.	60	Lincoln Electric Co., The	57
Ames, B. C. Co.	61	Logansport Machine, Inc.	52
Armstrong Bros. Tool Co.	58	Mall Tool Co.	55
Barber Colman Co.	49	McCrosky Tool Corp.	41
Brown & Sharpe Mfg. Co.	63	Morse Tool Company	39
Bullard Co., The	23	National Automatic Tool Co.	27
Chicago Wheel & Manufacturing Co.	59	National Twist Drill & Tool Co.	5
Continental Machine Specialties, Inc.	42	Odin Universal Corp.	61
Cushman Chuck Co., The	55	O. K. Tool Co., The	56
Danly Mahcine Specialties Inc.	34	Oster Manufacturing Co., The	62
Davis Boring Tool Co.	4	Pratt & Whitney	2
Delta Manufacturing Co.	35	Procunier Safety Chuck Co.	60
Dumore Co.	40	Q-C Engineering Products	48
Eclipse Counterbore Co.	49	R & M Manufacturing Co.	58
Ex-Cello-O Corp	64	Rivett Lathe & Grinder, Inc.	48
Federal Products Corp.	57	Ryerson & Son, Joseph T.	21
Firth-Sterling Steel Co.	45	Scully-Jones & Co.	26
Ford Motor Co., Johansson Gage Div.	49	Sheldon Machine Co.	58
Gairing Tool Co., The	28	Snyder Tool & Engr. Co.	24
Gammons-Holman Co., The	59	South Bend Lathe Works	53
Glenzer Co., The J. C.	55	Standard Pressed Steel Co.	60
Goddard & Goddard Co.	51	Starrett Co., The L. S.	51
Greenfield Tap & Die Corp.	61	Strand & Co., N. A.	60
Hannifin Manufacturing Co.	8	Stuart Oil Co., D. A.	30
Haskins Co., R. G.	54	Sundstrand Machine Tool Co.	44
Haynes Stellite Co.	3	Swartz Tool Products Co., Inc.	50
Heald Machine Co.	31	Tomkins-Johnson Co., The	59
Heuser Manufacturing Co.	61	Union Carbide & Carbon Corp.	3
Holo Krome Screw Corp.	47	Universal Engineering Co.	58, 62
Hydraulic Detroit Pump Corp.	38	Vacuum Cup Metal Pulley Co. Inc.	62
Jones & Lamson Machine Co.	32, 33	Vanadium Alloys Steel Co.	37
Knu-Vise Products Co.	56	Van Norman Machine Tool Co.	29
Krasberg & Sons, R.	59	Vickers, Inc.	7
		Vinco Tool Co.	62
		Weldon Tool Co.	36
		Wetmore Reamer Co.	46

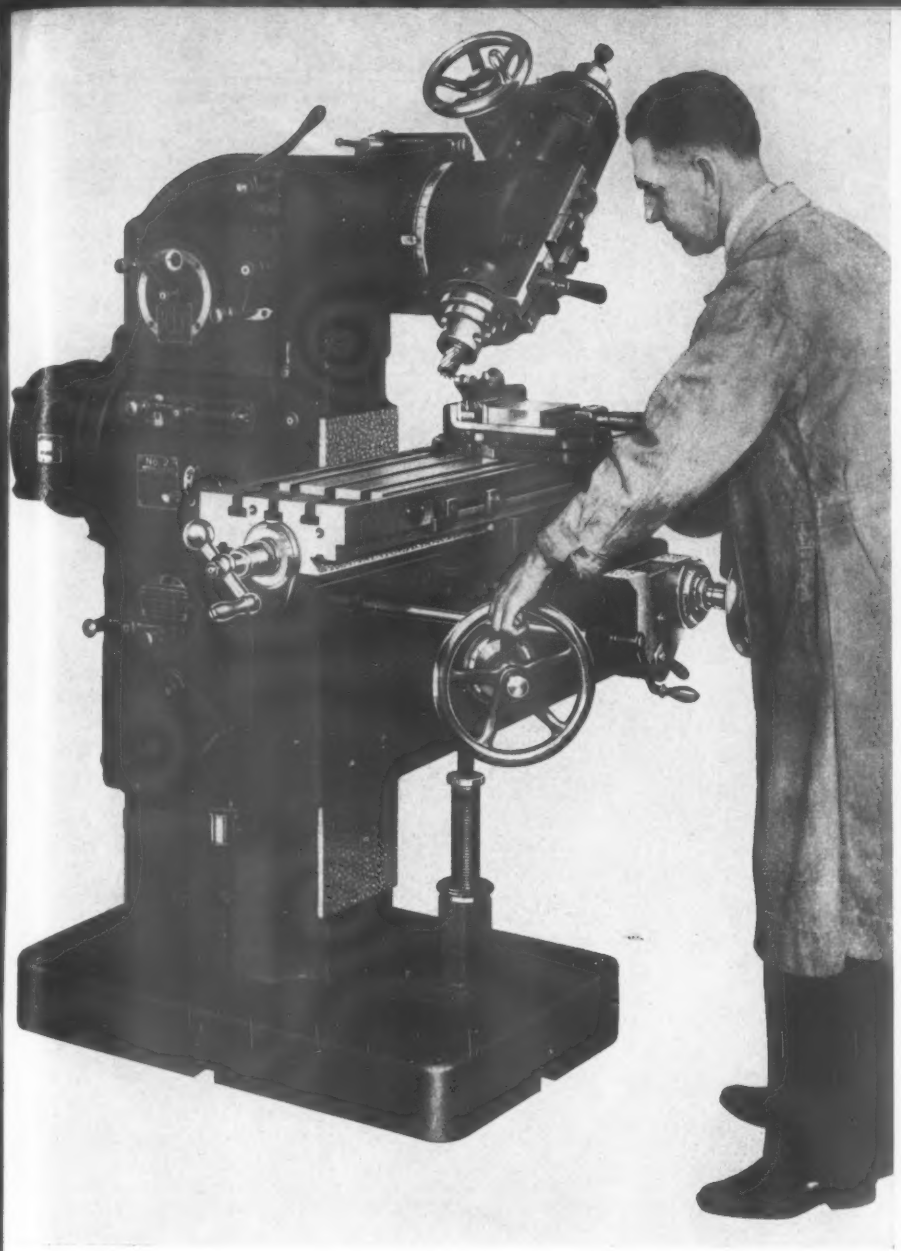
UNIVERSAL COLLET CHUCK

GRIPS AS STRONG AS SOLID STEEL

CONCENTRIC WITHIN .001

FOR END MILLS

UNIVERSAL ENGINEERING CO. FRANKENMUTH, MICH.



"LIGHT TYPES

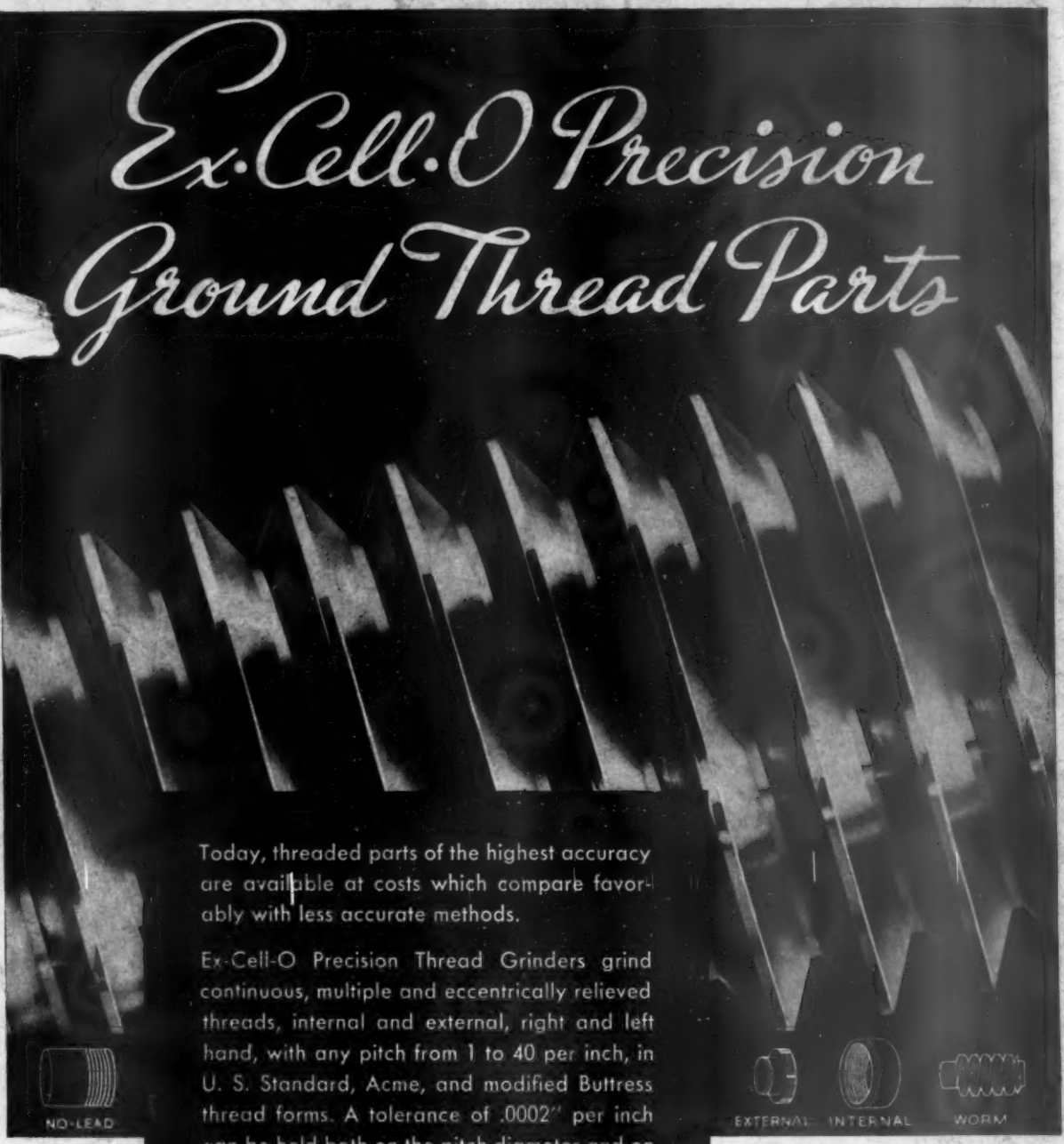
Increasingly Popular - - -

--No. 2 Universal
--No. 2 Plain
--No. 2 Vertical

Note swiveling spindle head on vertical machine — which permits setting the spindle in a vertical plane at any angle either side of O, from vertical to horizontal. Brown & Sharpe Mfg. Co., Providence, R. I.

BROWN & SHARPE

Ex-Cell-O Precision Ground Thread Parts



Today, threaded parts of the highest accuracy are available at costs which compare favorably with less accurate methods.

Ex-Cell-O Precision Thread Grinders grind continuous, multiple and eccentrically relieved threads, internal and external, right and left hand, with any pitch from 1 to 40 per inch, in U. S. Standard, Acme, and modified Buttress thread forms. A tolerance of .0002" per inch can be held both on the pitch diameter and on the lead. Threads ten per inch or finer are production ground directly from hardened blanks.

You are invited to make use of Ex-Cell-O's own completely equipped thread grinder department and of any of the many other Ex-Cell-O precision operations which may be involved in your product. Quotations will be gladly furnished from your blue print.

XLO

TRADE MARK

EX-CELL-O CORPORATION • DETROIT, MICHIGAN